

General Information

Name of Research Unit:	(COMP-Norte-Braga-319) CENTRO ALGORITMI
Coordinator:	Henrique Manuel Dinis Santos
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

The Centre Algoritmi (CALg) is a R&D unit of the University of Minho (UM), developing its activities in the areas of Systems Engineering, Information Technology/Information Systems and Electronics. It is organized around six research group (RG), reflecting different research and application domains. CALg has 223 members, 103 of them hold a PhD degree. Most of the doctorates members belong to the staff of three departments of the School of Engineering, while the reminder group is mainly composed of post-graduate students and research assistants.

According to the UM main regulation, academic staff members must be affiliated to one or more of the UM's R&D units, where their research activities are integrated. Concerning hierarchy R&D units depend on the rector, at the same organization level as Schools, but most of the human resources depend on departments, which are integrated in Schools. This way, R&D units become a complementary structure dedicated to research activity, joining human resources managed by departments. The UM established an organization matrix model, to enhance flexibility and improve resource utilization. The 3 existing CALg's RGs were established by department association logic – reorganization is ongoing, as reported further on this document.

CALg is organized around a Directive Committee (DC), formed by a Director, a Vice-Director and six Group Coordinators (GC), one for each RG. The Director is elected among all senior researchers (full or associate professors), by all CALg's members, and each GC is also elected among the respective group's elements. Elections take place in each two years (the last one was at March, 2006 - the election at 2008 was postponed since we are now preparing new regulations, following the modification process of the national university system). The DC is responsible for all the executive and planning tasks, including strategic planning and reporting activities. There is also a Scientific Committee (SC) formed by all the doctorate members, which is essentially responsible for approving the DC work and the premature destitution of the Director. Actually, to optimize resources, most of the SC matters are discussed at the same level within regular department meetings. Finally, there is a Consultive Committee, formed by external experts, to advice the strategic planning process. All the administrative daily work is accomplished by two staff members. CALg interact with other university units related to research activity, like GAP (project support office) and the accounting office.

General Objectives

As a university research centre, CALg aims in assuring the long-term R&D, which allows researchers to keep up-to-date. Usually this type of research does not produce measurable scientific results (projects and publications), which imposes serious difficulties concerning its support, especially now that university funding is being considerable reduced. However, long-term R&D continues to be considered an important goal.

Following the recommendations of the previous evaluation reports more attention was devoted to the interdisciplinary activities, defining strategies to explore synergies between groups. This was achieved through an internal call for projects, specific for that purpose and supported by 40% of the funds coming from FCT. The main idea behind this strategy keeps valid, since we believe that one of the CALg's strengths is its heterogeneous nature, which allows exploring different approaches and is an important factor towards innovation.

During the last years some modifications occurred in the university system, motivating a strategy to promote research at the UM. Improving research is always an objective of a R&D centre, but the actual context forces us to give this goal high priority. The first reaction was to make every researcher ware of the new demands and this measure, per si, produced interesting results in scientific production. However, to better explore the capacities of young researches, in particular, some other adjustments are required. Efforts are under way to reorganize CALg's research groups, promoting a leadership in each of the areas where research activities are well defined, there are enough human resources and the work produced foresees an excellent impact. These groups and its leaders will have a much more active role in the CALg management, but this requires a modification of the CALg's regulation, which is now being done.

Also following the recommendations from the last evaluation reports, the strategy for improvement must address a higher level of internationalization. CALg benefited from the FCT national program to support fellowships for post-doctoral positions in Portuguese R&D centres, and includes now 10 post-doctorate researchers with a main goal to improve internationalization.

FP7, the European 7th Framework Programme is also seen as a very important opportunity. This program addresses all type of research activities, including the co-operation between different R&D centres and the stimulus to young researcher initiative. All CALg researchers must be ware of this program and keep in touch with its evolution. Furthermore, since most of the project proposal evaluations are carried by researchers from all over Europe, and since this activity is also a source of knowledge and contacts, CALg's members are encouraged to register themselves as project reviewer candidates.

Co-operation should not be stimulated only at the international level. In some research areas there are other R&D centres in Portugal with very good groups. The collaboration with such groups is always an important goal since that is a natural way to get stronger groups with more potential to be recognized.

Finally, one last CALg'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 UM and the School of Engineering.

Main Achievements during the year of 2008

Objectives & Achievements

In 2008 there was an improvement in the number of publications (books, journals and international/national magazines). The total number increased to 88, which gives an annual increase of 33%. However, the actual ratio per ETI PhD member/year is 1.1098, similar to previous year since the number of PhD researchers has also increased. The number of communications, covering all sorts of conferences and workshops, both national and international, was 177. This value is slightly lower comparing to previous year, mainly due to the drop of publications in national conferences, which decrease from 50 to only 16. This is the result of a higher pressure to publish on international recognized events, and shows a weakness concerning the capacity to organize such events in Portugal. But globally, the publication indicators supersede the expected numbers, which reveals that CALg's researchers are aware of the current challenges. Despite this promising progress, quality had not improved at the same ratio within all groups, and some groups clearly need to give more attention to this aspect. By other side, the groups that in the past show better performance (Systems Engineering and Micro/Nano Technologies) keep their status, being recognized between the best in their areas.

In 2008 it was completed the first phase of the Portuguese Government initiative "Ciência 2007". Under this program CALg opened 10 post-doctoral calls resulting on 7 new research assistants admitted. Concerning the 3 non taken positions, 2 resulted from candidates giving up and 1 had no candidates. Another grant opportunity in 2008 was the FCT initiative "integration into research grants", created to foster the involvement of university level students with research activities at the R&D Centres. Under this program CALg were allowed to open 24 calls. Only 10 were occupied, mainly due to lack of student's awareness (the following call in 2009 showed a much better response level).

Another important achievement is the number of thesis produced: 16 PhD thesis and 62 MSc thesis. There is a tendency for the number of PhD thesis to decrease, not accompanying the rise of CALg's doctorate members, which reveals a weakness concerning the capacity to attract external PhD candidates. By other side the number of MSc thesis shows a tendency to increase, which reveals a growth in the enrolment of students at this level.

The number of funded projects is another indicator of the CALg's performance. This indicator keeps high (funding from projects represent near 70% of the CALg's global budget – about 1,5M€/year). During 2008 CALg's members were responsible or were involved in over 33 approved projects (European, FCT and other governmental agencies that promote programs mainly for research in co-operation with industries).

In 2008 were produced 7 prototypes and 11 patents (registered at the international and national levels). Most of these achievements came from the Industrial Electronic Group and the Micro & Nano Technologies group, which are the research areas that work more closely with physical devices typically more suitable to this kind of accomplishment.

Concerning the organization of scientific/technical events, in 2008 CALg's members were involved in 19 events (excluding the participation in technical committees). In several areas some of these events are considered very topical being supported by organizations which play an important role in those areas (i.e. ACM, IEEE and IFIP) - the details are given in the individuals RG's reports.

Activities

Integrative/multidisciplinary activities during the year of 2008

CALg is a multidisciplinary research centre by nature. Within its main scientific areas it is not difficult to identify a wide research stream including researchers from Electronic field, addressing the construction of physical computer based devices, Engineering Systems field, focusing on the construction of 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, 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 resources 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' expertise are aggregated; and sharing knowledge activities, which conduces to a deeper understanding of surrounding requirements.

CALg members are involved in the national initiatives with CMU and MIT, addressing several engineer disciplines. At a local level, there is a significant research stream involving researchers from the Industrial Electronic group and researchers from another UM research centre (2C2T Centre of Science and Textile Technology). This collaboration resulted in some important industrial projects. Other similar collaborations embrace researchers from the CIPsi (Centre for Research in Psychology) and CCTC (Centre of Sciences and Computer Technologies), mainly within Knowledge and Information Systems and Services group activities, and researchers from "Officina Mathematica", CEB (Centre of Biological Engineering) and CITEPE (Interdisciplinary Centre in Technologies for Energy Production), mainly within Nonlinear Systems Optimization and Statistics group activities.

Knowledge sharing is the second form of collaboration, which can be accomplished by seminars, workshops, or similar meetings. This kind of activities has been planed several times. However, the lack of resources, the actual overload of senior researchers (due to teaching loads and administrative duties) and an unusual level of external requests (in the last 18 months CALg was submitted to 3 audits), impose serious restrictions to these activities.

Outreach activities during the year of 2008

In recent years the number of external requests has been raising remarkably. From low level schools to social and economy agents, there is a clear desire to come near universities as a mean to approach knowledge. After all, this is the essence of the knowledge society. University as a whole, respond to this requests positively opening its doors and organizing or adhering to several events. This is a global movement traversing all university units. Concerning CALg, 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 divulgation events. Due to lack of clarification between research and teaching affairs it is not always possible to track these individual initiatives.

The School of Engineering organizes every year an event associated to its birthday, aimed to show to society and organizations technical innovations and science advances resulting from research. For one particularly activity PhD students are invited to take part on an exhibition where they have the opportunity to show their work and discuss with others their problems and achievements - most of the CALg's members adhered enthusiastically to this initiative. But other activities are also relevant, like visits to laboratories where young students can contact with the research environment and with the learning environment most of them will face in the near future.

One of the CALg's groups working in the robotic area developed a robot football team and has been involved in the RoboCup competition, where they have achieved very interesting results. The group also organizes a local event, RoboParty, in Guimarães, which attracts researchers, college students and teachers, and other interested people. This had a tremendous impact, calling the attention to this area. More information

Activities

is available at <http://www.robotica.dei.uminho.pt/robocup>.

CAlg's members are also deeply involved in several national non-profit organizations/associations dedicated to the normalization and dissemination of technological and scientific knowledge. Among them are: APDSI (Portuguese association for information society development); two Technical Committee for normalization under auspicious of the Ministry of Economy.

Funding

	2004	2005	2006	2007	2008
LA FCT	0,00	0,00	0,00	0,00	0,00
Units FCT	0,00	0,00	0,00	0,00	334.631,25
Projects FCT	0,00	0,00	0,00	0,00	911.841,00
Other (National)	0,00	0,00	0,00	0,00	510.539,75
Other (International)	0,00	0,00	0,00	0,00	1.226.766,00
National Industry	0,00	0,00	0,00	0,00	166.521,00
International Industry	0,00	0,00	0,00	0,00	0,00
	0,00	0,00	0,00	0,00	3.150.299,00

General Indicators

	2004	2005	2006	2007	2008	Total
No. of Researchers Proposed	0,00	0,00	0,00	0,00	0,00	0,00
No. of Researchers Hired (LA)	0,00	0,00	0,00	0,00	0,00	0,00
Balance	0,00	0,00	0,00	0,00	0,00	0,00
No. of Researchers Hired (Ciência Programme)	0,00	0,00	0,00	0,00	7,00	7,00
No. of Researchers (FTE) (*)	54,00	61,00	73,00	82,00	95,00	
Training Masters (Master thesis completed)	29,00	19,00	21,00	38,00	62,00	169,00
Training PhDs (PhD thesis completed)	60,00	35,00	31,00	8,00	16,00	150,00

Researchers Hired

Name	Start Date	End Date	Other Institution
Abdullah Rashed	22-12-2008		
Agostinho Gil Teixeira Lopes	02-05-2008		
Chan Tak Ming	19-11-2008		
Hakikur Rahman	03-11-2008		
João Paulo Pereira do Carmo	02-05-2008		
MD. ABUL KALAM AZAD	01-10-2008		
Nuno Ricardo Palmeiro Otero	03-03-2008		

Technical Personnel Hired

Name	Start Date	End Date	Other Institution
No technical personnel found...			

Additional Comments**Research Groups**

Reference	Title / Principal Investigator
RG-COMP-Norte-Braga-319-2168	<u>Nonlinear Systems Optimization and Statistics</u> (Edite Manuela da Graça Pinto Fernandes)
RG-COMP-Norte-Braga-319-2169	<u>Systems Engineering, Optimization and Operations Research</u> (José Manuel Vasconcelos Valério de Carvalho)
RG-COMP-Norte-Braga-319-2171	<u>Knowledge and Information Systems and Services</u> (Joao Alvaro Brandao Soares de Carvalho)
RG-COMP-Norte-Braga-319-2184	<u>Ubiquitous and Pervasive Computing, Graphics, and Software Methodologies</u> (Adriano Jorge Cardoso Moreira)
RG-COMP-Norte-Braga-319-2959	<u>Industrial electronics</u> (Carlos Alberto Caridade Monteiro e Couto)

Research Groups**Reference**

RG-COMP-Norte-Braga-319-2976

Title / Principal Investigator

Micro/Nanotechnologies and Biomedical Applications
(José Higinio Gomes Correia)

Group Description

Title of Research Group: (RG-COMP-Norte-Braga-319-2168)
Nonlinear Systems Optimization and Statistics

Principal Investigator: Edite Manuela da Graça Pinto Fernandes

Main Scientific Domain: Engenharia Electrotécnica e Informática

Group Host Institution: Universidade do Minho

Funding, source, dates

Funding, source, dates

Um método de redução para programação semi-infinita não linear, POCI/MAT/58957/2004, 12000 € (05-07), PI: Vaz, AI, members: Fernandes, E, Monteiro, MT, Costa, L, Pereira, AI

Optimização sem derivadas e aplicações, POCI/MAT/59442/2004, 23000 €, (05-07), PI: Vicente, L, member: Vaz, AI

Mathematical Analysis of Piezoelectric Problems, POCI/MAT/59502/2004, 9904€ (05-07), PI: Figueiredo, I, members: Oliveira, P, Costa, L

Computação Avançada em Engenharia – Reequipment program, FCT, since May 2004, 195000€, PI: Teixeira, J, member: Leão, C

Módulos expositivos de Matemática, PVI/ID 880/06, 4000 € (06-08) member: Pereira, AI

Eureka, PVI/ID 355/06, 10000 € (06-08), PI: Pereira, AI

Desenvolvimento Musical na Infância e Primeira Infância, PTDC/EAT/68361/2006, 180966 €, PI: Rodrigues, H, member: Braga, AC.

WALC - Laboratório Assistido pela Web para o Ensino de Engenharia de Controlo, PTDC/ESC/68069/2006, 70000 € (08-10), PI: Leão, C

Versatility of Filtering Techniques in Non-Linear Programming Optimization

Research grant RFQ/3-12584/08/NL/ST funded by ESA, 12/08-09-09, PI: Vicente, L., member: Monteiro, MT.

Objectives & Achievements

Objectives

1. Continuous Nonlinear Optimization

Two algorithms based on the filter method using SQP and Inexact Restoration approach, were implemented. The filter strategy was successfully incorporated into a primal-dual interior point method.

2. Derivative-Free Optimization

A heuristic pattern search method based on a random walk was used to solve minimax problems. Further, an algorithm for derivative free optimization in connection with global optimization was developed.

3. Global Optimization

General nonlinear constrained global problems were successfully solved by a novel filter-like method combined with the stochastic electromagnetism-like algorithm.

4. Mathematical Program with Complementarity Constraints

The MPCC problem was studied in its nonlinear reformulation and with penalization and regularization techniques. A real application in the electric power market was studied.

5. Mixed Integer Programming

Studies concerning with the application of a filter-like stochastic global algorithm have been started to solve large problems.

6. Multi-objective Optimization

Ongoing research: development of dimensionality reduction methods in order to facilitate representation, visualization and search of optimal solutions; improvement of multi-objective evolutionary algorithms; study of performance metrics for algorithm comparison.

7. Semi-Infinite Programming

Continuously merit functions, as well as a filter strategy, have been used to guarantee global convergence of reduction methods for Semi-Infinite programming (SIP). The implementation of reduction type algorithms for SIP motivates algorithms for multi-local optimization.

8. Statistics and Applications

Regular collaborations with professionals from the Health Science area for the design of experiments and data analysis have been carried out; and research on Receiver Operating Characteristic analysis continues

9. Innovativeness and Network Competence

The importance of the concepts of innovativeness and network competence was study; their components were identified and their integration was empirically examined.

Main Achievements

1) Invitation to review papers in International Journals:

International Journal of Emerging Electric Power Systems

IEE Transactions on Evolutionary Computation

Journal of Information Technology and Decision Making

Objectives & Achievements

Journal of Computational and Applied Mathematics

Journal of Mathematical Sciences

Mathematics of Operations Research

Computers and Mathematics with Applications

Computational Optimization and Applications

International Journal of Robotics and Automation

Optimization and Engineering

Journal of Heuristics

Optimization Methods and Software

Journal of Global Optimization

Optimization

Computer Applications In Engineering Education

2) Invitation to review papers in Conferences:

ICNAAM2008

Congress on Evolutionary Computation (CEC-2008)

EURO Mini Conference "Continuous Optimization and Knowledge-Based Technologies"

17th IASTED International Conference on Applied Simulation and Modelling - ASM 2008

ICEE 2008 - International Conference on Engineering Education

SIECI 2008 - 5to Simposium Iberoamericano en Educación, Cibernética e Informática

3) Supervision of ongoing PhD students - 4; MSc students – 3;

4) The group has been granted a post-doc position (Ciência 2007 /FCT) for 5 years for research in the project "Global and Mixed Computational Optimization": Md.A.K. Azad (J5256693Q712)

5) The group has been granted 3 BII/FCT(graduate student):

Sara T M N Morais (J518782U7E3J), Tiago F M C Martins (J523959G237Q), Francisco A G Ribeiro (J52396464KC5)

6) Advanced courses: a) in "Applied Optimization in Science and Engineering" (3 MSc students, 5 PhD students and 2 PhD) – 3 curricular units: Modeling and Nonlinear Optimization, Derivative-free Optimization and Genetic and Evolutionary Algorithms, 2008/09.

b) Short course in "Optimization Applied to Biomedicine", IPB, Bragança (12 hours) May 2008.

Group Productivity

Publications in peer review Journals

Impact Factor J C R (Thomson) (ip)(2007)

number citations (nc=ISI,Scopus,Google.Scholars)

Cited Half-life (CHI)

Afonso, P.; Nunes, M.; Paisana, A.; Braga, A.C. (2008) The influence of time-to-market and target costing in the new product development success, I. J. Production Economics, 115(2):559-568 (ip=0.995)(nc= , ,)(CHI=).

Carneiro, F.; Leão, C.P.; Teixeira, S.F.C.F., (2009) Teaching differential equations in different environments: a first approach, (accepted) Computer Applications in Engineering Education (11pp.) (ip= 0.310 (in 2007)).

Costa, M.F.P.; Fernandes, E.M.G.P. (2008) Practical implementation of an interior point nonmonotone line search filter method. I. J. of Computer Mathematics, 85(3-4):397-409 (ip=0.423)(nc=1, ,2)(CHI=6.6)

Costeira, M.J.;Oliveira, P., Ares, S., de Escobar, G.M., Palha, J.A. (2009). Iodine status of pregnant women and their progeny in the Minho Region of Portugal. Thyroid, 19(2):157-63 (ip=2.692)(nc=0, ,)(CHI=5.7)

L. Lemos, S. Flores; P. Oliveira, A. Almeida (2008) Gabapentin supplemented with ropivacain block of trigger points improves pain control and quality of life in trigeminal neuralgia patients when compared with gabapentin alone. Clinical Journal of Pain, 24(1):64-75 (ip=3.578)(nc=0, ,)(CHI=3.0)

J. Oliveira, P. Oliveira, R. Baumes, O. Maia (2008) Changes in aromatic characteristics of Loureiro and Alvarinho wines during maturation. Journal of Food Composition and Analysis. 21:695–707 (ip=2.106)(nc=1, ,)(CHI=5.2)

J. Oliveira, P. Oliveira, R. Baumes, O. Maia (2008) Volatile and glycosidically bound composition of Loureiro and Alvarinho wines. Food Science and Technology International, 14(4):341–353 (ip=0.632)(nc=0, ,)(CHI=6.1)

Pereira, A.I.P.N.; Fernandes, E.M.G.P. (2009) A reduction method for semi-infinite programming by means of a global stochastic approach. Optimization. 58 p. 17 (29 May on line DOI: 10.1080/02331930701764072)(ip=0.408)(nc=0,0,0)(CHI>10)

Rocha, A.M.A.C.; Fernandes, E.M.G.P. (2009) Modified movement force vector in a electromagnetism-like mechanism for global optimization. Optimization Methods and Software. 24(2):253-270 (ip=0.554)(nc=0,0,0)(CHI=6.1)

Silva, C.E.P.; Monteiro, M.T.T. (2008) A Filter algorithm - comparison with NLP solvers. I. J. of Computer Mathematics, 85(3-4):667-689 (ip=0.423)(nc=0, ,) (CHI=6.6).

Silva, C.E.P.; Monteiro, M.T.T. (2008) A Filter Inexact-Restoration Method for Nonlinear Programming. TOP, 16(1):126-146 (ip=)(nc=0, ,)(CHI=)

Vaz, A.I.F.; Ferreira, E.C. (2009) Air pollution control with semi-infinite programming. Applied Mathematical Modelling. 33:1957-1969 (ip=0.572)

Group Productivity

(nc= , ,) (CHI=7.6)

Vaz, A.I.F.; Vicente, L.N. (2009) PSwarm: A hybrid solver for linearly constrained global derivative-free optimization, Optimization Methods and Software (ip=0.554) (accepted) (<http://www.mat.uc.pt/~lnv/papers/PSwarm-lin.pdf>)

Other publications International

Books:

Costa, L.; Braga, A.C.; Oliveira, P. - Tuning Parameters of Evolutionary Algorithms using ROC Analysis. Advances in Soft Computing 49: 217-222I (WPACBB'08) 2008.

Costa, M.F.P.; Fernandes, E.M.G.P. - Efficient solving of engineering design problems by an interior point 3-D filter line search method. Numerical Analysis and Applied Mathematics, T.E. Simos, G. Psihoyios and Ch. Tsitouras (Eds.), AIP Conference Proceedings ISBN: 978-0-7354-0576-9, Vol. 1048 (197-200) DOI:10.1063/1.2990890, Springer-Verlag 2008.

Pereira, A.I.P.N.; Fernandes, E.M.G.P. - A hyperbolic penalty filter method for semi-infinite programming. International Electronic Conference on Computer Science, T.E. Simos and G. Psihoyios (Eds.), AIP Conference Proceedings ISBN 978-0-7354-0590-5, Vol. 1060, Issue 1 (11-14) DOI:10.1063/1.3037033, Springer-Verlag 2008.

Pereira, A.I.P.N.; Fernandes, E.M.G.P. - Numerical experiments with a continuous L₂-exponential merit function for semi-infinite programming. International Electronic Conference on Computer Science, T.E. Simos and G. Psihoyios (Eds.), AIP Conference Proceedings ISBN 978-0-7354-0590-5, Vol. 1060, Issue 1 (11-14) DOI:10.1063/1.3037033, Springer-Verlag 2008.

Rocha, A.M.A.C.; Fernandes, E.M.G.P. - Feasibility and dominance rules in the electromagnetism-like algorithm for constrained global optimization. Lecture Notes in Computer Science - Computational Science and Its Applications (O. Gervasi et al. (eds.)), Vol. 5073 (768-783) Springer-Verlag 2008. DOI:10.1007/978-3-540-69848-7_61.

Rocha, A.M.A.C.; Fernandes, E.M.G.P. - Performance profile assessment of electromagnetism-like algorithms for global optimization. International Electronic Conference on Computer Science, T.E. Simos and G. Psihoyios (Eds.), AIP Conference Proceedings ISBN 978-0-7354-0590-5, Vol. 1060, Issue 1, (15-18) DOI:10.1063/1.3037042, Springer-Verlag 2008 (nc= , ,1)

Rocha, A.M.A.C.; Fernandes, E.M.G.P. - A modified electromagnetism-like algorithm based on a pattern search method, Lecture Notes in Electrical Engineering - Proceedings of the European Computing Conference (Mastorakis, Nikos; Mladenov, Valeri; Kontargyri, Vassiliki T. (eds.)) ISBN: 978-0-387-84818-1, Vol. 28 (1035-1042) Springer-Verlag 2009.

Rodrigues, C.S.; Fernandes, E.M.G.P.; Martins, F.V. - Purchasing as an integrated competence, G. Putnik; M. Cunha. : IGI Global, 1309-1316, 2008. ISBN: 978-1-59904-885-7.

Rodrigues, C.S.; Fernandes, E.M.G.P.; Martins, F.V. - A new perspective for network innovation. G. Putnik; M. Cunha. : IGI Global, 1074-1079, 2008. ISBN: 978-1-59904-885-7.

Silva, M.A.; Leão, C.P.; Teixeira, S.F.C.F.; Teixeira, J.C.F.,- Droplet distribution flowing in a venturi scrubber. C.A. Brebbia. : WIT Press, 2008. 179-188, ISBN: 978-1-84564-120-7.

Conference Proceedings:

Arezes, PM, Neves, MM, Teixeira, SF, Leão, CP, Cunha, JL (2008) Thermal comfort of trekking boots: objective versus subjective evaluation, in Karwowski, W., Salvendy, G. (Eds.) AHFE 2008 - 2nd International Conference on Applied Human Factors and Ergonomics, jointly with 12th International Conference on Human Aspects of Advanced Manufacturing (HAAMAH), 14-17 July, Las Vegas, USA, 10 pgs., ISBN 978-1-60643-712-4

Costa, D.; Leão, C.P.; Barroso, M.P., "Assessing Usability Characteristics of an Application for Education on Prevention of Musculoskeletal Disorders", Proceedings of the Paris International Conference on Education, Economy & Society, July 2008, Paris, France , 6 pages.

Costa, M.F.P.; Fernandes, E.M.G.P. - A three-D filter line search method within an interior point framework. I C Computational and Mathematical Methods in Science and Engineering. ISBN 978-84-612-1982-7, 173-187, 2008.

Leão, C.P.; Pimentel, C.; Rodrigues, C.S. (2008) Engineering Student versus Engineer: a Portuguese case of Female Industrial Engineers. Paris International Conference on Education, Economy & Society. 12pages.

Leão, C.P.; Pimentel, C.; Rodrigues, C.S. - Engineering Student versus Engineer: a Portuguese case of Female Industrial Engineers . Paris International Conference on Education, Economy & Society. 12 pages. 2008.

Lemos, F.; Leão, C.P.; Soares, F.O. (2008), SimLab: A Virtual Lab for Control Problems. An undergraduate Experience, VU2008 - Virtual University. Slovakia, December 2008, 5pages.,

Lemos, F.; Carvalho, N.C.; Soares, F.O.; Leão, C.P.; Fernandes, T.; Rodrigues, H. (2008), User-centred dynamic and shared Web sites to support the learning activities for University students – concepts, ICEE 2008 - New Challenges in Engineering Education and Research in the 21st Century, Pécs-Budapest, July 2008, 9pages

Martins, L.A.S.B.; Madureira, F.; Leão, C.P.; Silva, A.M.; Nunes, M.L.; Teixeira, S.F.C.F. - Optimization Tools and Economical Issues in the Design of a Residential Cogeneration system. CHEMPOR'2008. 6 pages 2008.

Monteiro, M.T.T., Meira, J.F.P.- A penalty method and a regularization strategy to solve MPCC, I C Computational and Mathematical Methods in Science and Engineering, 425-437, ISBN 978-84-612-1982-7, 2008.

Mota, A.T.M.; Vaz, A.I.F. - A reduction type penalty algorithm for nonlinear semi-infinite programming, Preprints of the IFAC Workshop on Control Applications of Optimization (CAO'09), 6 pages 2009, Finland.

Pereira, A.I.P.N.; Fernandes, E.M.G.P. - On a reduction line search filter method for nonlinear semi-infinite programming problems. Euro M C "Continuous Optimization and Knowledge-Based Technologies". L. Sakalauskas, G.W. Weber, E.K. Zavadskas (eds.) ISBN: 978-9955-28-283-9, 174-179, Lithuania 2008.

Group Productivity

Rocha, A.M.A.C.; Fernandes, E.M.G.P. - On charge effects to the electromagnetism-like algorithm. Euro M C "Continuous Optimization and Knowledge-Based Technologies". L. Sakalauskas, G.W. Weber, E.K. Zavadskas (eds.) ISBN: 978-9955-28-283-9, 198-203, Lithuania 2008. (nc= , , 1)

Rocha, A.M.A.C.; Fernandes, E.M.G.P. - Hybrid optimization coupling electromagnetism and descent search for engineering problems. I C Computational and Mathematical Methods in Science and Engineering. ISBN 978-84-612-1982-7, 533-545, 2008.

Rocha, A.M.A.C.; Fernandes, E.M.G.P. - Implementation of the Electromagnetism-Like Algorithm with a Constraint-Handling Technique for Engineering Optimization Problems. 2008 Eighth International Conference on Hybrid Intelligent Systems, ISBN: 978-0-7695-3326-1, IEEE Computer Society, 690-695, 2008.

Rodrigues, H.S.F.;Monteiro,M.T.T.;Vaz, A.I.F. - A MPCC approach on a Stackelberg game in an electric power market. I C Computational and Mathematical Methods in Science and Engineering, ISBN 978-84-612-1982-7, 547-557, 2008

Silva, M.A.; Leão, C.P.; Teixeira, S.F.C.F.; Teixeira, J.C.F., - Droplet distribution flowing in a venturi scrubber. Design & Nature 2008 - Comparing Design in Nature with Science and Engineering. 10 pages 2008.

Other publications National

Leão, C.P., Teixeira, S.F.C.F. (2008), Ensinar conforto térmico aos cursos profissionais, Proceedings of the 5º Simposium Iberoamericano en Educación, Cibernética e Informática: SIECI 2008, 29 de Junio al 2 de Julio, Orlando, Florida, USA, 3 pages.

Loureiro, I; Leão, C.P.; Arezes, P. (2008), "Desenvolvimento de um modelo de análise ergonómica: impacto da população utilizadora na análise", in Arezes, PM, Baptista, JS, Barroso, MP, Carneiro, PS, Cordeiro, PM, Costa, N, Melo, R, Miguel, AS, Perestrelo, AS (Eds.) Proceedings of the International Symposium on Occupational Safety and Hygiene - SHO2008, ISBN 978-972-99504-4-5, pp.177-182.

Loureiro, I; Leão, C.P.; Arezes, P. (2009), "Modelo de áreas comerciais com livre circulação de pessoas", in Arezes, PM et al. (Eds.) Proceedings of the International Symposium on Occupational Safety and Hygiene - SHO2009, ISBN 978-972-99504-5-2, pp.273-277.

Neves, MM, Teixeira, SF, Leão, CP, Arezes, PM (2008) Projecto de vestuário termicamente confortável, in Silva Gomes, JF, António, CC, Afonso, CF, Matos, AS (Eds) Proceedings of the CLME'2008 / IICEM, Maputo, 2 - 4 Setembro, Edições INEGI, ISBN 972-8826-10-9, 9 pages.

Neves, MM, Arezes, PM, Teixeira, SF, Leão, CP (2008) Desenvolvimento de Calçado Termicamente Confortável, in Arezes, PM, Baptista, JS, Barroso, MP, Carneiro, PS, Cordeiro, PM, Costa, N, Melo, R, Miguel, AS, Perestrelo, AS (Eds.) Proceedings of the International Symposium on Occupational Safety and Hygiene - SHO2008, ISBN 978-972-99504-4-5, pp. 207-218.

Teixeira, S.F.C.F.; Leão, C.P.; Arezes, P.M.M.; Neves, M.M. (2008), Desenvolvimento de ferramenta informática para ensinar conforto térmico, 4 pp, Actas da 1ª Conferência Sobre Edifícios Eficientes, 25 de Janeiro de 2008, Faculdade de Ciências do Mar e do Ambiente, Universidade do Algarve, CD-Rom.

Master and Ph.D. thesis completed

1) Rodrigues, C.M.S. "A inovação em rede e o desempenho empresarial: ensaio de um modelo de equações estruturais para a indústria portuguesa". PhD Thesis, U Minho, 2008 (supervisors: Fernandes, EMGP & Martins, FV).

2) Meira, J.F.P., "Implementação de funções de penalidade e esquemas de regularização na resolução de Problemas de Optimização com Restrições de Complementaridade em ambiente MATLAB", MSc thesis, U Minho 2008 (supervisor: Monteiro, MTM)

3) Loureiro, I.M.P.L.F., "Ergonomic Evaluation Model in Para-Pharmacy: identification, characterization and connections with the population", MSc (Human Engineering) thesis, U Minho 2008 (supervisor: Leão, CP).

4) Costa, M.R.G. "Simulation and Control of a tank level and temperature - TlSim", MSc (Industrial Electronic Engineering) thesis, U Minho 2008 (supervisor: Leão, CP).

5) Lemos, F.J.G., "Virtual Laboratory – Control Problems Simulation" MSc (Industrial Electronic Engineering) thesis, U Minho 2008 (supervisor: Leão, CP).

6) Couto, A.C.V. "Análise custo-benefício da implementação de uma nova tecnologia de comunicação na Administração Regional de Saúde do Norte", Graduate Thesis, U Minho, 2008 (supervisor: Rocha, AMAC).

7) Gonçalves, E.A. "Análise custo-efectividade na implementação de três alternativas de rastreio do cancro colo-rectal", Graduate Thesis, U Minho, 2008 (supervisor: Rocha, AMAC).

Organization of conferences

1) Seminars:

"Adventures in global optimization", Michael Bartholomew-Biggs, September 2008, U Minho, Braga, Portugal.

"Some new advances and challenges in modern continuous optimization with semi-infinite and conic quadratic programming - theory, methods and applications", Gerard-Wilhelm Weber, October 2008, U Minho, Braga, Portugal.

"Recent advances in barrier methods in nonlinear programming" & "Simultaneous nonlinear programming strategies for dynamic optimization", Lorenz Biegler, October 2008, U Minho, Braga, Portugal.

2) Scientific Committee:

Congress on Evolutionary Computation (CEC-2008).

International MultiConference of Engineering and Computer Scientists (IMECS 2008).

17th IASTED International Conference on Applied Simulation and Modelling - ASM 2008.

XVI Congresso da Sociedade Portuguesa de Estatística

Industry contract research

Group Productivity

Contract research with:

- 1) ARSN (Administração Regional de Saúde do Norte) – aiming to provide means for the organization and implementation of primary health care policies.
- 2) Águas do Ave – public company located in the north of Portugal with a mission of exploring and managing WWTP and dealing with domestic and industrial effluents.

Internationalization

- 1) Collaboration (Monteiro M.T.T.) in the project ESA RFQ/3-12584/08/NL/ST . The project aims to investigate and assess the potential of filter methods for space engineering applications. The prime contractor is University of Birmingham. Sub-contractors shall be the University of Southampton and the University of Coimbra.
- 2) Participation (Pereira, A.I.P.N. and Fernandes, E.M.G.P.) in research project with Weber, G. and Sureyya from Institute of Applied Mathematics, Middle East Technical University, Turkey.
- 3) An MPCC problem (Monteiro M.T.T.) freely available in MacMPEC ampl collection of Mathematical Programs with Equilibrium Constraints (<http://www.mcs.anl.gov/~leyffer/MacMPEC/problems/monteiroB.mod>).
- 4) Lifelong Learning Program: Erasmus bilateral agreement for the years 2009/2012, between Slovenska Technicka Univerzita, Slovak Republic, and University of Minho (Leão, C.P.). Theme: Computer and Control Education

Future Research

Objectives

The list of some objectives of research in the project Continuous Nonlinear Optimization considers

- 1) using NLP techniques to solve some classical and recent challenging problems of optimal control;
- 2) investigating and assessing the potential of filter methods for space engineering applications;
- 3) evaluating the performance of a four-dimensional filter interior point technique.

In the project Derivative-Free Optimization, Optimal WWTP design that relies on efficient modeling will be carried out using a heuristic non-differentiable technique. Development of algorithms for derivative free optimization in connection with global optimization will continue.

Large Integer problems, like set-partitioning and travelling salesman problems, will be addressed and solved by an augmented Lagrangian stochastic population based method that is under development in the project Global Optimization. Their solutions will be compared with classical exact methods.

In the Multi-objective Optimization, the study of performance metrics for algorithm comparison will continue.

Due to the success of primal-dual interior point filter methods in finite optimization, an extension will be implemented in a reduction method context for problems that arise in the project Semi-Infinite Programming.

In the context of the project Statistics and Applications, a new proposal considers Structural Equation Modeling (SEM) and issues in research design and model estimations. SEM will be used to examine a series of dependence relationships simultaneously and is a particularly useful technique in testing theories involving latent variables. This program explores frequent problems with survey questionnaires' data.

Another future project will use WALC – Web Assisted Laboratory for Control on-line Education. This type of laboratory will be for pedagogical use in graduate and post graduate levels. In Control teaching/learning process, WALC will allow the user to choose the practical engineering problem and the control to be implemented. Since the control problems are modeled by a set of differential-algebraic equations (DAE), it will be used as a tool to test several numerical methods in order to obtain the DAE solution. In this way, synergies between different acquired competencies during the student academic path are established. EGI-Women: Contribute to a gender-specific perspective concerning Portuguese women engineers' career progression by the identification and discussion of the main variables that influence career progression of women engineers (work in collaboration with the Ordem dos Engenheiros Região Norte).

Funding, source, dates

MLocProg - Multilocal programming package, PTDC/MAT/099882/2008, PI: Pereira, AI, member: Fernandes, E.

Interactive Science, PTDC/CPE-CED/108841/2008, member: Pereira, A.I.

Plasma Layer- Towards an understanding of the plasma layer formation in microfluidic devices, PTDC/EME-MFE/105715/2008, member: Pereira, AI;

CSD-Chip - Development of an integrated biomedical microdevice for blood cell separation and deformation, PTDC/SAU-BEB/105650/2008, member: Pereira, AI;

Distributed and intelligent disturbance handling in manufacturing systems, PTDC/EEA-AUT/098992/2008, member: Pereira, AI;

NAIPHCA – New Approaches to Improve Primary Health Care Access, PTDC/MAT/099256/2008, PI: Rocha, AMAC, members: Fernandes, EMGP., Costa, L., Braga, A.C.;

WWTP Modeling and Cost Optimization, PTDC/EQU-ESI/098645/2008, PI: Espírito Santo, IA, members: Fernandes, EMGP

Derivative-free optimization: future challenges and new applications, PTDC/MAT/098214/2008, PI: Vicente LN, member: Vaz, A.I.

Sustainable electricity power planning, PTDC/SEN-ENR/099578/2008, PI: Ferreira, P., member Vaz, A.I.

Diagnostic test evaluation - ROC curves, PTDC/MAT/101123/2008, PI: Braga, A.C.; members: Costa, L.; Oliveira, P.

MALGOD: Models and Algorithms for Optimal Cost Management Systems Design, PTDC/EGE-GES/104891/2008, PI: Afonso, P., members: Rocha, A.M.; Costa, L.

Language Design (LD) is an Erasmus programme multilateral project proposal for the key activity 2.2.2.: Projects focusing on cooperation

Future Research

between higher education institutions and enterprises, member: Leão, C.P.

Group Description

Title of Research Group: (RG-COMP-Norte-Braga-319-2169)
Systems Engineering, Optimization and Operations Research

Principal Investigator: José Manuel Vasconcelos Valério de Carvalho

Main Scientific Domain: Engenharia Electrotécnica e Informática

Group Host Institution: Universidade do Minho

Funding, source, dates

Funding, source, dates

POSI/SRI/48873/2002, Application of Branch-and-Price Algorithms in Scheduling, funded by FCT (2004-2008). 40000 €

POSC/EIA/57203/2004, Models, algorithms and tools for large scale integer optimization, funded by FCT (2005-2008). 70000 €

SCOOP (Sheet cutting and process optimization for furniture enterprises) (Contract N° COOP-CT-2006-032998), funded by the European Commission, 6th Framework Programme on Research, Technological Development and Demonstration, specific actions for SMEs, Cooperative Research Projects (2006-2008). 1,200,000 €

PTDC/TRA/72871/2006, ASTRA - Alternative System of Transport for Rural Areas, funded by FCT (2007-2010) 116.263,00 €

Development of state-of-the-art algorithms for the solution of very complex multicommodity network flow Network Design Problems (Processo 4.1.5-Tunísia), funded by Programa de Cooperação Científica e Tecnológica entre a FCT e o Ministério do Ensino Superior, da Investigação Científica e da Tecnologia da Tunísia (2008-2009). 5000 €

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:

1. Conduct both fundamental and applied research, targeting to publish in the highest quality and flagship journals;
2. Establish research mobility, exchange and cooperation programs with internationally renowned research centers;
3. Establish high quality research contracts with surrounding industries and services, aiming at contributing to their development;
4. Target the job placement of our PhD and MSc students in surrounding industries and services after they graduate;
5. Develop a research environment attractive to international graduate students, particularly from Portuguese speaking countries, and to postdoctoral researchers;
6. Encourage the involvement of postgraduate students in ongoing research projects

Main Achievements

1. Publications

The number of papers published in 2008 increased: there were 10 papers published or in press in international journals (9 ISI journals), 2 chapters in books, and papers, and 28 papers published in conference proceedings. Many researchers of the group completed their only PhD recently. There are many publications in conference proceedings with results from their PhD thesis, which are expected to be further developed and submitted to international journals.

2. Internationalization

In order to pursue objective 2 referred to above, six internationally renowned professors visited SEOOR, and gave seminars on their current research. Following their visits, two research cooperation programs have already been approved, and others are expected to follow. Some of these cooperation programs are in areas within the group that gained a critical mass when researchers got their PhDs, enabling targeting larger scope projects and to establish new international links. For further details, see Section Internationalization, Subsection New Collaborative research.

3. International visibility

International visibility and recognition of the group increased: there are 84 citations in ISI Web of Knowledge, 135 citations in Scopus and 265 citations in <http://scholar.google.pt/> for the papers published in the group.

4. Prizes and awards

The following prizes were awarded:

Paulo Sampaio: 3rd Best Paper presented at ASQ World Conference on Quality and Improvement, in the Student Technical Paper Competition, Houston, EUA, 2008.

Paulo Sampaio: Best Research Work in Quality 2008, awarded by the Associação Portuguesa da Qualidade, in the 33rd 33º Colóquio da Qualidade, to the PhD Thesis "Estudo do Fenómeno ISO 9000: Origens, Motivações, Consequências e Perspectivas".

5. New post-doctoral researchers

Objectives & Achievements

Two Post-doctoral researchers were contracted in 2008:

Chan Tak Ming, PhD Univ. Hong-Kong, Programa Compromisso Ciência 2008.

Jürgen Rietz, PhD U.Freiberg, Germany, Post-doctoral grant from FCT, 2008.

Group Productivity

Publications in peer review Journals

Alves CMM, Valério de Carvalho, JM - A Stabilized Branch-and-Price-and-Cut Algorithm for the Multiple Length Cutting Stock Problem. *Computers and Operations Research*. Vol. 35: n° 4 (2008), p. 14.

Alves CMM, Valério de Carvalho, JM - A branch-and-price-and-cut algorithm for the pattern minimization problem. *RAIRO Operations Research*. Vol. 42: n° (2008), p. 19.

Alves CMM, Valério de Carvalho, JM - New Integer Programming Formulations and an Exact Algorithm for the Ordered Cutting Stock Problem. *Journal of the Operational Research Society*. Vol. 59: n° (2008), p. 12.

Clautiaux, F.; Alves, CMM; Valério de Carvalho, JM - A survey of dual-feasible and superadditive functions. *Annals of Operations Research*. Vol. in press (DOI: 10.1007/s10479-008-0453-8): n° (2008), p. 22.

Koblasa, F.; Dias, L.S.; Oliveira, J.A. - Scheduling Optimization Using Local Search and Genetic Algorithm. *ACC Journal*. Vol. 14: n° 1 (2008), p. 174-181.

- Cláudio Alves, Rita Macedo, José Valério de Carvalho, New Lower Bounds Based on Column Generation and Constraint Programming for the Pattern Minimization Problem, *Computers and Operations Research*, doi:10.1016/j.cor.2009.01.008.

- José A. Faria; Eusébio Nunes; Manuel A. Matos - Cost and quality of service analysis of production systems based on the cumulative downtime. *International Journal of Production Research*, doi: 10.1080/00207540802068631

- Carina Pimentel, Filipe Alvelos, J.M. Valério de Carvalho, Comparing Dantzig-Wolfe decompositions and branch-and-price algorithms for the multi-item capacitated lot sizing problem, to appear *Optimization Methods and Software*, 2008.

- Filipe Alvelos, T. M. Chan, Paulo Vilaça, Tiago Gomes, Elsa Silva, J. M. Valério de Carvalho, "Sequence based heuristics for 2-dimensional bin-packing problems", to appear in *Engineering Optimization*, 2008.

Other publications International

Chapters in Books

Telhada, J., Pinho, T. and Sameiro, M.S. - Beyond supply chain management in the construction industry: extended enterprises foresight overview. in "Encyclopedia of Networked and Virtual Organization", edited by G. Putnik and M. M. Cunha, Idea Group Inc., 2008, Vol. III, pp. 1567-1572. Idea Group Inc., 2008. 6. 978-1599048857.

Gleb Belov, Guntram Scheithauer, Cláudio Alves, José Valério de Carvalho - Gomory Cuts from a Position-Indexed Formulation of 1D Stock Cutting . in *Intelligent Decision Support* (Eds. A. Bortfeldt, J. Homberger, H. Kopfer, G. Pankratz and R. Strangmeier). : Gabler /Deutscher Universitätsverlag, 2008. 12. ISBN-10:3-8349-0930-0.

Figueiredo, MCB - e-Commerce: Forecasting Demand for New Products. IADIS International Conference e-commerce 2008. Amsterdam, The Netherlands: July, 2008. Edited by: Sandeep Krishnamurthy, pp. 102-112, ISBN: 978-972-8924-66-9.

Full Text in Proceedings of Conferences

Pimentel, C.; Alvelos, F.; Duarte, A.; Valério de Carvalho, J.M. - A Scheduling Model for a Knitting Planning Problem. 3rd World Conference on Production and Operations Management - POM. Tokyo: August, 2008, pp 2239-2254, ISBN: 978-4-88361-646-6. An extended and improved paper was submitted to an international journal.

Carvalho, M.; Nunes, E. and Telhada, J. - Optimal periodic inspection of series systems with revealed and unrevealed failures. ESREL 2008. Valencia, Spain: September, 2008.

Cerqueira, P; Dias, L; Oliveira, J.A.; Pereira, G. - Scheduling Operations in a Foundry industry. First International Conference on Business Sustainability. Ofir: Junho, 2008.

Cláudio Alves, Rita Macedo, José Valério de Carvalho - Optimizing Transportation Processes in Urban Waste Collection Systems. *Business Sustainability*, 2008. Ofir: Junho, 2008.

Costa, B.; Dias, L.; Oliveira, J.A.; Pereira, G. - Simulation as a Tool for Planning a Material Delivery System to Manufacturing Lines. *International Engineering Management Conference Europe 2008*. Estoril: Junho, 2008.

Dias, L.; Pereira, G.; Oliveira, J.A. - Event Scheduling Made Easy: Basic Simulation Facility Revisited. 20th European Modeling and Simulation Symposium. Campora S. Giovanni, Italy: Setembro, 2008.

Figueiredo, MCB - e-Commerce: Forecasting Demand for New Products. IADIS International Conference e-commerce 2008. Amsterdam, The Netherlands: July, 2008.

Gama S.; Teixeira S.; Lopes I. - Certificação da qualidade em instituições particulares de solidariedade social. 5º Congresso Luso-Moçambicano de Engenharia. Maputo, Moçambique: Setembro, 2008.

Geraldes, Carla A S, Carvalho, M Sameiro F B S, Pereira, Guilherme A B - A Warehouse Design Decision Model – Case Study. *International Engineering Management Conference Europe 2008*. Estoril: Junho, 2008.

Koblasa, F.; Dias, L.; Oliveira, J.A. - Simulation and possibility of optimization in ERP/APS systems. 4th annual International conference for Ph.D students and young researchers. Zlín, Czech Republic: Abril, 2008.

Koblasa, F.; Dias, L.; Oliveira, J.A.; Pereira, G. - Heuristic Approach as a way to Improve Scheduling in ERP/APS Systems. 15th European Concurrent Engineering Conference. Porto: Abril, 2008.

Lopes I. S.; Leitão A. L. F.; Pereira G. A. B. - Workplace occupation and equipment availability and utilization, in the context of maintenance float systems. ESREL 2008. Valência, Espanha: Outubro, 2008.

Lopes I.; Pires L.; Bastos P. - A decentralized predictive maintenance system based on data mining concepts. First International Conference on Business Sustainability. Esposende, Portugal: Junho, 2008.

Miranda, P; Cunha, S; Oliveira, J.A. - Simulation Methodology to design a AGV transportation System. First International Conference on Business

Group Productivity

Sustainability. Ofir: Junho, 2008.

Neto, H.; Arezes, P.M.; Sousa, S.D. - New performance indicators for the Health and Safety domain: a benchmarking use perspective. ESREL 2008 & 17th SRA-Europe Conference. Valencia - Spain: Setembro, 2008.

Oliveira, J.A. - Heuristic methods to scheduling operations in parallel machines. 10th International Chemical and Biological Engineering Conference. Braga: Setembro, 2008.

Pavel, V.; Dias, L.; Oliveira, J.A.; Pereira, G. - Using 3D Simulation in an Internal Logistic Process. 15th European Concurrent Engineering Conference. Porto: Abril, 2008.

Pavel, V.; Dias, L.; Oliveira, J.A.; Pereira, G. - Using of 3D Simulation in the Industry Internal Logistic Process. ICTKI – 2nd. International Conference of Technology Knowledge and Information. Usti nad Labem, Czech Republic: Janeiro, 2008.

Pinho, T.; Telhada, J. and Sameiro, M.S. - Supply chain management in construction - case study of a portuguese company. International Conference on Lean Construction (IGLC 16). Manchester, UK: July, 2008.

Pinho, T.; Telhada, J. and Sameiro, M.S. - Case Study of a Portuguese Supply Chain Management Model in Construction. Hamburg International Conference of Logistics HICL 2008. Hamburg, German: September, 2008.

Pinho, T.; Telhada, J. and Sameiro, M.S. - Managing construction supply chain. IEMC - Europe 2008, Int. Engineering Management Conference. Estoril, Portugal: June, 2008.

Pinho, T.; Telhada, J. and Sameiro, M.S. - Integração da cadeia de abastecimento na indústria da construção civil. in Actas do 3º Congresso Luso Brasileiro para o Planeamento Urbano, Regional, Integrado, Sustentável (PLURIS). Santos, Brasil: October, 2008.

Pinho, T.; Telhada, J. and Sameiro, M.S. - Definition of a logistics model in the construction industry – case study. EUROSIS The European Concurrent Engineering Conference. Porto, Portugal: April, 2008.

Santos, D.; Sousa, A.; Alvelos, F. - Traffic Engineering of Telecommunication Networks based on Multiple Spanning Tree Routing. International Workshop on Traffic Management and Traffic Engineering for the Future Internet FITraMen 08. Porto: December, 2008.

Lopes, Isabel S , Leitão, Armando L F, Pereira, Guilherme A B, (eds), p. 675-683. - Workplace occupation and equipment availability and utilization, in the context of maintenance float systems. ESREL 2008, Safety, Reliability and Risk Analysis: Theory, Methods and Applications. Valência, Espanha: Setembro, 2008.

Dias, Luis M S, Pereira, Guilherme A B, Oliveira, José A V - Event Scheduling Made Easy: Basic Simulation Facility Revisited. European Modeling and Simulation Symposium. Campora S Giovanni, Itália: Setembro, 2008.

Pavel, Vik, Dias, Luis M S, Oliveira, José A V, Pereira, Guilherme A B - "Using 3-D Simulation in a Industry Internal Logistic Process. EUROSIS, 15th European Concurrent Engineering Conference. Porto: Abril, 2008.

Geraldes, Carla A S, Carvalho, M Sameiro F B S, Pereira, Guilherme A B - A Linear Programming Model for the Storage Location Assignment Problem – A Case Study. EUROSIS, 15th European Concurrent Engineering Conference. Porto: Abril, 2008.

Neto, H.; Arezes, P.M.; Sousa, S.D. - New performance indicators for the Health and Safety domain: a benchmarking use perspective. ESREL 2008 & 17th SRA-Europe Conference. Valencia - Spain: Setembro, 2008. pp761-765.

Other publications National

Alvelos, F.; Martins, I.; Constantino, M. - Um Algoritmo de Partição e Geração de Colunas para Um Problema de Gestão de Florestas com Restrições Espaciais. 13º Congresso da APDIO (Associação Portuguesa de Investigação Operacional). Vila Real: Março, 2008.

Barros, S.; Sousa, S.D. - O contributo das quatro matrizes do QFD para um sistema de melhoria contínua. 33º Colóquio da Qualidade. Évora: Novembro, 2008. Apresentação oral.

Chan, T.M.; Alvelos, F.; Silva, E.; Valério de Carvalho, J.M.; Alves, C.; Macedo, R. - Novas Heurísticas para o Problema de Empacotamento a Duas Dimensões em Dois e Três Estágios. 13º Congresso da APDIO (Associação Portuguesa de Investigação Operacional). Vila Real: Março, 2008.

Gomes, T.; Alvelos, F.; Oliveira, J.A.; Valério de Carvalho, J.M. - Experiências com Um Modelo de Programação Inteira para o Problema de Escalonamento Job Shop. 13º Congresso da APDIO (Associação Portuguesa de Investigação Operacional). Vila Real: Março, 2008.

Martins, I.; Alvelos, F.; Constantino, M. - Uma Abordagem em Programação Inteira para Problemas de Gestão de Florestas para Produção de Madeira com Restrições Ambientais. Encontro Nacional da Sociedade Portuguesa de Matemática 08. Coimbra: Junho, 2008.

Pimentel, C. ; Alvelos, F.; Valério de Carvalho, J.M.; Duarte, A. - Modelos de Planeamento de Tricotagem - Estudo de Caso. 13º Congresso da APDIO (Associação Portuguesa de Investigação Operacional). Vila Real: Março, 2008.

Santos, D.; Sousa, A.; Alvelos, F. - Optimização de Redes Ethernet Baseadas em Múltiplas Árvores de Suporte. 13º Congresso da APDIO (Associação Portuguesa de Investigação Operacional). Vila Real: Março, 2008.

Silva, E.; Alvelos, F.; Valério de Carvalho, J.M. - Um Novo Modelo de Programação Inteira para o Problema de Corte a Duas Dimensões. 13º Congresso da APDIO (Associação Portuguesa de Investigação Operacional). Vila Real: Março, 2008.

Master and Ph.D. thesis completed

PhD Thesis

Sampaio, P., "Estudo do Fenómeno ISO 9000: Origens, Motivações, Consequências e Perspectivas", Advisors: G. Rodrigues (SEOR), Pedro Saraiva (Univ. Coimbra), 2008.

František Koblasa, "Planning of operations in a SME foundry industry", Advisor: Oliveira, JA, 31-03-2008

MSc Thesis

Maurício Pinto Cerqueira Pereira, Normalização dos Processos de Gestão de Embalagem numa empresa de Auto-Rádios. Adv: Carvalho, M. S. Mestrado Integrado em Engenharia e Gestão Industrial (MIEGI) 28-11-2008

João Francisco Domingues de Azevedo, Sistema de Apoio à Decisão na Logística da Biomassa. Adv: Carvalho, M. S.; Teixeira, J. C. Mestrado Engenharia Mecânica 30-08-2008

Lia Coelho de Oliveira, Optimização de Fluxos Inbound num TIER2 da Indústria Automóvel. Adv: Figueiredo, MCB MIEGI 15-07-2008

Camilo Miguel Ramos Moreira, Optimização do Fluxo de Informação na Cadeia de Abastecimento: Tratamento e Certificação da Informação Relevante para a Gestão de Stocks.. Adv: Figueiredo, MCB MIEGI 24-11-2008

Group Productivity

- Eduardo Alberto Ferreira da Sá Moreira, Total Productive Maintenance approach applied to a maintenance service company. Adv: Lopes, I. S. MIEGI -12-2008
- Marco Bruno Machado Alves Moura, Implementação de métodos e ferramentas da qualidade para redução de não conformidades no processo de recauchutagem. Adv: Lopes, I. S. MIEGI -12-2008
- Pedro Filipe Margalho Mendes, Contributos para a melhoria da disponibilidade e para a redução de riscos em Unidades de Transformação de subprodutos de origem animal. Adv: Nunes, E Mestrado em Engenharia Industrial (MEI) 02-10-2008
- Paula Alexandra Costa Cerqueira, Construção de modelos de simulação de uma fundição para pesquisa de configurações e métodos de trabalho mais eficientes. Adv: Oliveira, JA; Dias, LS MEI
- Bruna Neto, Benchmarking ao processo de soldadura por onda na indústria automóvel. Adv: Sérgio Sousa MIEGI -12-2008
- Fernando António Fontes Guedes, Aplicação das ferramentas 6-sigma na melhoria da qualidade do processo de soldadura Reflow. Adv: Sousa, S.; Nunes, E; MEI 19-09-2008
- António Nuno Matias de Melo e Castro, Sistema de previsão e divulgação em tempo real de tempos de chegada de autocarros a paragens. Adv: Telhada, J. MEI 14-07-2008
- Ana Cecília Dias Ferreira, Gestão de um sistema flexível de transporte público de passageiros em áreas rurais. Adv: Telhada, J. e Carvalho, M.S. MIEGI 28-11-2008

Organization of conferences

- Sousa, S.D., - member of scientific committee, First international conference on Business Sustainability, 2008, Ofir, Portugal June 2008.
- V. Carvalho, EURO XXIV Lisbon - 14th European Congress on Operations Research of EURO (The Association of European Operational Research Societies), Lisbon, July 2010.
- V. Carvalho, F.Alvelos, IO 2009, 14o Congresso da Associação Portuguesa de Investigação Operacional, 2009, FCT-Universidade Nova de Lisboa, Lisboa
- V. Carvalho, MCPL 2010 - IFAC Conference on Management and Control of Production and Logistics, September 8 - 10, 2010, University of Coimbra, Portugal
- J. Telhada, Thematic track on "Artificial Intelligence in Transportation and Urban Mobility" of the EPIA 2009 - Fourteenth Portuguese Conference on Artificial Intelligence, October 12-15, 2009, University of Aveiro.

SEMINARS (organizer, speaker, title, place date)

- Figueiredo, MCB, Richard Eglese, GREEN LOGISTICS and VEHICLE ROUTING, Guimarães, 31-10-2008.
- Oliveira, J.A., Parallelizing Metaheuristics for Complex Optimization, Braga, 03-10-2008.
- Valério de Carvalho, JM, DISSEMINATION OF RESEARCH RESULTS OF PROJECT SCOOP, Braga, 13-10-2008.
- Valério de Carvalho, JM, Mohamed Haouari, A SMOOTH INTRODUCTION TO BENDERS DECOMPOSITION, Braga, 22-10-2008.
- Valério de Carvalho, JM, Antoine Jouglet, A NEW GRAPH-THEORETICAL MODEL FOR K-DIMENSIONAL GUILLOTINE-CUTTING PROBLEMS, Braga, 27-10-2008.
- Valério de Carvalho, JM, Jacques Carlier, ON A RESOURCE CONSTRAINED SCHEDULING PROBLEM IN THE CONTEXT OF DISTRIBUTED SYSTEMS, Braga, 27-10-2008.
- "Pereira, Guilherme AB; Dias, Luis MS, Antoni Guash: Simulation in Logistic Processes: Methodology and Case Studies, Guimarães, 15-07-2008."

Industry contract research

- Coindu, S.A., Portugal (fabric and leather car set manufacturer with annual sales of 90M€) in operations planning and leather cutting. (50000 euros) 2006-. Coordinator: V.Carvalho. P. Brás was awarded a BDE grant (SFRH/BDE/ 15650/ 2007) (Joint FCT-Company PhD grant), and is involved in this project.
- DST, Portugal (construction company with annual sales of 100 M€). Logistic network model in the construction industry. 2005-2009. Coordinators: J. Telhada and M. Sameiro Carvalho. T. Pinho was awarded a BDE grant (SFRH/BDE/ 15545/ 2005), and is involved in this project.
- Moldartpóvoa, Portugal (manufacturer of frames for pictures/paintings; leader in Portugal with growing sales across Europe) development of a quality management system (QMS). (6000 euros) 2006. Coordinators: E. Nunes and S. Sousa.
- Several MSc students had/have thesis work related to their employing companies (Blaupunkt, Delphi, HOFESA, FAL, Kromberg & Schubert).

Internationalization

1. Collaborative publications and research:

- V. Carvalho, C. Alves with F. Clautiaux (Université de Lille, France) in dual feasible functions
- V. Carvalho, C. Alves with G.Scheithauer, G. Belov (Dresden University of Technology, Germany), in cutting and packing.
- V. Carvalho, C. Alves, F. Alvelos with F. Pezzella (Università Politecnica delle Marche, Italy) and Cláudio Arbib (Università degli Studi dell'Aquila, Italy) - Project SCOOP (Sheet cutting and process optimization for furniture enterprises) (Contract N° COOPCT- 2006-032998), funded by the European Commission, 6th Framework Programme.

2. New Collaborative research:

The following professors visited SEOOR, and gave seminars:

- Richard Eglese, Lancaster University, U.K.
- Jacques Carlier, Compiègne University of Technology, France
- Antoine Jouglet, Compiègne University of Technology, France
- Antonio Guasch Petit, Universitat Politècnica de Catalunya, Spain
- Enrique Alba, University of Málaga, Spain

Group Productivity

Mohamed Haouari, Özyegin University, Istanbul, Turkey, and ROI, Tunisia.

The following research cooperation programs have already been approved, and others are expected in the near future:

1. Development of state-of-the-art algorithms for the solution of very complex multicommodity network flow Network Design Problems (Processo 4.1.5-Tunisia), funded by FCT e o Ministério do Ensino Superior, da Investigação Científica e da Tecnologia da Tunísia (2008-2009).
2. Advanced Optimization Techniques based on Hybrid Integer and Constraint Programming Methods: Application to Vehicle Routing and Cutting Stock Problems, funded by Programa de Cooperação Transnacional ao abrigo do Acordo entre a FCT e o Centre National de la Recherche Scientifique (CNRS) de França (2009-2010).
3. Graduate Training Networks

Valério de Carvalho, JM taught a Short Course on Optimization Algorithms for cutting stock and packing problems, Universidade de S.Paulo (Instituto de Ciências Matemáticas e Computação), April 2008.

Valério de Carvalho, JM taught a Short Course on Optimization Algorithms for cutting stock and packing problems, École Polytechnique de Tunisie, La Marsa, Tunisie, 24 th - 25 th November 2008.

Several members of the group taught Operations Management and Supply Chain Management courses in the LTI and TME Programs of EDAM (Engineering Design and Advanced Manufacturing) of the MIT-Portugal Program.

Government/Organization contract research

Protocolo IMTT (3 years – 50.000€/year) – Contrato de Prestação de Serviços entre o Instituto de Mobilidade e dos Transportes, IP e a Universidade do Minho. Estudo de soluções de apoio à decisão e monitorização no contexto da Unidade de Regulação Ferroviária (URF) do IMTT (Coordinators: Carvalho, M. Sameiro).

Future Research

Objectives

Several research projects were submitted as part of the research program in four major areas, listed below, as they were defined in SEOOR mission. The main objectives of each project are stated:

1. Optimization (Large Scale Integer Programming and Meta-heuristics, and their application in Cutting and Packing, Scheduling and Manufacturing)

Improvement of the ability to solve large and complex optimization problems in different application areas. Two promising approaches are: using decomposition methods in linear and integer programming, such as column generation or branch-and-price-and-cut, and using hybrid methods combining linear and integer programming, problem-specific algorithms, and meta-heuristics. Envisaged application areas in Network design and routing, Forest management, Production planning and scheduling, Cutting and packing and Supply chain optimization.

Development of efficient hybrid optimization methods for relevant industrial processes, and to extend these results to define a general framework for the integration of Constraint Programming (CP) and Integer Programming (IP) methods, focusing on the integration of CP in stabilized branch-and-price-and-cut methods that rely on cutting planes procedures based on dual feasible functions (DFF).

2. Logistics and Transportation (Supply Chain Management, Transportation Systems, Forecasting and Inventory)

Development of forecasting models to estimate online sales of a company for inventory management and business planning purposes. These models are expected to be capable of forecasting future demand with the accuracy required to provide an adequate service level to customers and to reduce the company operational costs. Envisaged application area is E-commerce.

3. Modeling and Simulation (Automatic translation and program generation, and their application in manufacturing)

Development of a hybrid heuristic that combines Linear Programming solution with a genetic algorithm based in random keys. A series of minor adaptations may be enough to build a very robust algorithm, capable of obtaining near-optimal solutions for a wide variety of instances of the facility location problem. Envisaged application in location and routing problems that will include methods hybridising Genetic Algorithms and Local Search.

Development of a simulation model for the vehicle logistic system of an industrial unit.

4. Quality, Reliability and Maintenance (Quality Management Systems, Certification and Accreditation, and Reliability)

Development of a framework for organisations with different quality maturity levels to improve their sustainability based on knowledge of Quality, reliability and maintenance tools, performance measurement systems and the "continuous improvement process", thus, linking improved knowledge management to operational and organizational performance.

Funding, source, dates

1. Projects approved

Research Projects within the Program of EDAM (Engineering Design and Advanced Manufacturing) of the MIT-Portugal Program involving 2-3 PhD students

Institutions: UM, IST, MIT and Industrial Affiliates.

Advanced Optimization Techniques based on Hybrid Integer and Constraint Programming Methods (see above)

Development of state-of-the-art algorithms for the solution of very complex multicommodity network flow Network Design Problems (see above)

PTDC/TRA/72871/2006, ASTRA - Alternative System of Transport for Rural Areas (see above)

Protocolo IMTT

Institutions: Instituto de Mobilidade e dos Transportes, IP, UM (see above)

2. Projects with pending funding (Coordination of SEOOR researchers)

FCT (PTDC/EIA-EIA/100645/2008): SearchCol: Meta-heuristic Search by Column generation

Coordinator: Filipe Alvelos

Future Research

Institutions: UM, FC/UL, IT, ISEP/IPP

Requested funding: 92.514,00€

Linking sTrAtegy to Quality iniTiatives to Improve organisational outCome (TAQTIC)

Coordinator: Sousa, Sérgio

Requested funding: 89.827,00€

PTDC/GES/64417/2006, RaLoRes: Rationalization of logistics for selective collection of Municipal Solid Waste

Coordinator: J.A. Oliveira

Requested funding: 92.165,00€

ECOFIM e-Commerce: Forecasting and Inventory Management

Coordinator: M.C. Figueiredo

Requested funding: 78.288 €

Integration of Constraint and Integer Programming in Advanced Optimization Algorithms Coordinator: Cláudio Alves

Requested funding: 112.820€

Group Description

Title of Research Group: (RG-COMP-Norte-Braga-319-2171)
Knowledge and Information Systems and Services

Principal Investigator: Joao Alvaro Brandao Soares de Carvalho

Main Scientific Domain: Engenharia Electrotécnica e Informática

Group Host Institution: Universidade do Minho

Funding, source, dates

Funding, source, dates

SSI: Sustainable Software Industry, Jan/2007-, 59.659€.

uPAIN: Ubiquitous Solutions for Pain Monitoring and Control in Post-Surgery Patients, ADI, Jan/2005-Mai/2008, 220.000€.

SPAM Telescope Miner: worldwide unsolicited email detection using data mining techniques, FCT, 70.000€, Jan/2008- Dec/2010.

MOBioPro - Modeling and Optimization of Biological Processes, FCT, 73.000€, Jul/2005-Jun/ 2008.

Sistema de Apoio à Decisão Inteligente para Medicina Intensiva – INTCARE, FCT, 133.000€. Jan/2008-Dez/2010.

Learning Classifiers Systems for Grid Data Mining – GRIDCLASS, FCT, 51.100€. Jul/2007-Abr/2010.

MIKRO MARKT - Holistic Micro Marketing for Women Farmers, Leonardo Project, 27.429€, Oct/2008 – Set/2011.

BATinLoko – Environmental performance indicators and their relation with economic factors in textile BAT implementation, LIFE+ Environment Policy and Governance 2007, 2008-2010, 50.000€.

Objectives & Achievements

Objectives

General objectives for the KISSrg address its consolidation: increase the number of publications in international refereed journals; increase the participation in R&D projects with international consortia; reinforce the RG's maturity, quality, and internationalization. In this matter, some particular aspects will be pursued: strengthen the criteria to be used for selecting the conferences and journals researchers aim to publish at; promote the statement of the R&D programs the R&D communities are using implicitly; encourage that PhD thesis are written in English.

More specific objectives are related to the work being carried out by the several R&D communities associated to the RG: knowledge management; business processes; business intelligence; information services; scholarly communication; information systems security, software engineering and management. Although focusing on different problems/opportunities and relying on different scientific and technical areas, work in these communities is shaped by the R&D themes/streams the RG defined: Organizational Well-Being (OWB); Valuable and Trustable Information Services – VTIS; Sustained Software Industry (SSI)

Main Achievements

The results achieved during 2008 are at the same level of those of the previous year. In what concerns projects, there was a strong involvement in preparing projects proposals and setting up consortia. Most of the results of this effort aren't yet known.

2008 was also a transition year, affected by a "change of cycle" in European funding and affected as well by internal changes in the centre with the definition of new research groups and in the structure of graduate programs at the university.

It is worth to mention the reinforcement of involvement in international activities related to social aspects of information systems and in the area of information systems security.

Group Productivity

Publications in peer review Journals

1. Á. Silva, P. Cortez, M.F. Santos, L. Gomes and J. Neves. Rating Organ Failure via Adverse Events using Data Mining in the Intensive Care Unit. In *Artificial Intelligence in Medicine*, Elsevier, 43 (3): 179–193, 2008. ISSN:0933-3657. (ISI JCR2007 1.825: ranked 21th of 93 in "Computer Science, Artificial Intelligence", Scopus, DBLP, <http://hdl.handle.net/1822/8015>).
2. Neves, J., Santos, M. Machado, J. Abelha, A., Allegro, S. Salazar, M., Electronic Health Records and Decision Support Local and Global Perspectives. *WSEAS TRANSACTIONS ON BIOLOGY and BIOMEDICINE*, Issue 8, Volume 5, August 2008. (Scopus).
3. Ferreira, M., Rodrigues, E., Baptista, A. A., & Saraiva, R. (2008). Carrots and Sticks - Some Ideas on How to Create a Successful Institutional Repository. *D-Lib Magazine*, 14(1/2). Retrieved from <http://www.dlib.org/dlib/january08/ferreira/01ferreira.html>.
4. Sue Carroll, Ricardo J. Machado, Fernando Brito e Abreu. From the Editor. *ASQ Software Quality Professional Journal (SQPJ)*, vol. 10, no 4, pp. 3 4, September, 2008, American Society for Quality, [ISSN 1522 0540].

Other publications International

1. Tenreiro de M. S.; Guimarães, Carlos; Santos, Henrique; Revett, Kenneth; Jahankhani, Hamid. 2008. "Voice Based Authentication Using the Null Frequencies", Trabalho apresentado em 3rd International Conference on Information Warfare and Security, In Proceedings of the 3rd International Conference on Information Warfare and Security, Omaha.
2. Alves, P., Amaral, L., and Pires, J. "Case-based reasoning approach to Adaptive Web-based Educational Systems," in: 8th IEEE International Conference on Advanced Learning Technologies, Santander, Cantabria, Spain, 2008.
3. Tenreiro de M. S.; Santos, Leonel; Amaral, Luís; Santos, Henrique; Revett, Kenneth; Jahankhani, Hamid. 2008. "Structured Textual Data Monitoring Based on a Rough Set Classifier", Trabalho apresentado em 7th European Conference on Information Warfare and Security, In Proceedings of the 7th European Conference on Information Warfare and Security, Plymouth.

Group Productivity

4. Revett, Kenneth; Jahankhani, Hamid; Tenreiro de M. S.; Santos, Henrique. 2008. "User Dynamics in Graphical Authentication Systems", Trabalho apresentado em International Conference on Global e-Security, In Proceedings of the ICGeS 2008, Londres.
5. Revett, Kenneth; Jahankhani, Hamid; Tenreiro de M. S.; Santos, Henrique. 2008. "A Survey of User Authentication Based on Mouse Dynamics", Trabalho apresentado em International Conference on Global e-Security, In Proceedings of the ICGeS 2008, Londres.
6. Amaral, L. "Realidade Virtual no Ensino-Aprendizagem: Uma breve análise de oportunidades," in: INTERTECH'2008 - X International Conference on Engineering and Technology Education, COPEC – Council of Researches in Education and Sciences, Peruíbe, Brazil, 2008.
7. Magalhães, Sérgio Tenreiro de; Leonel Duarte dos Santos; Kenneth Revett; Henrique M. D. Santos. "Keystroke Dynamic and Graphical Authentication Systems" in Encyclopedia of Information Science and Technology, Second ed., USA: IDEA-GROUP, Mehdi Khosrow-Pour, IRMA, Outubro 2008, 1–6. ISBN: 978-1-60566-026-4
8. Santos, L., and Amaral, L. "SISTEMAS DE GESTÃO DE CIÊNCIA E TECNOLOGIA BASEADOS NA INFORMAÇÃO CURRICULAR DOS INVESTIGADORES: PLATAFORMA DEGÓIS," in: CEIDAO 08 - 1ª Conferência Internacional Angola: Ensino, Investigação e Desenvolvimento, Braga, 2008.
9. Varajão, J., Gonçalves, R., Barroso, J., and Amaral, L. "INFORMATION SYSTEMS FUNCTION: ACTIVITIES, RESOURCES, AND INFLUENCING FACTORS," in: 5º CONTECSI Congresso Internacional de Gestão de Tecnologia e Sistemas de Informação, São Paulo, Brasil, 2008.
10. Amaral, L. "Falácias na Adopção de Tecnologias e Sistemas de Informação," 5º Congresso Luso-Moçambicano de Engenharia / 2º Congresso de Engenharia de Moçambique, Maputo, 2008, pp. 33-34.
11. Pereira, T. and H. Santos, An Ontology Based Approach to Data Surveillance, in Proceedings of ECIW 2008: 7th European Conference on Information Warfare and Security, University of Plymouth, UK, 30 June – 1 July, 2008. (ISI)
12. Alexandre Bragança, Ricardo J. Machado. Transformation Patterns for Multi-staged Model Driven Software Development. Proceedings of the 12th International Software Product Line Conference – SPLC 2008, Session of Model-based Development, Limerick, Ireland, September, 2008, pp. 329-338, IEEE Computer Society Press, Los Alamitos, California, U.S.A., [ISBN 978 0 7695 3303 2].
13. José E. Fernandes, Ricardo J. Machado, João A. Carvalho. Model-Driven Development for Pervasive Information Systems. Soraya Kouadri Mostéfaoui, Zakaria Maamar, George M. Giaglis (Eds.), Advances in Ubiquitous Computing: Future Paradigms and Directions, chap. III, pp. 45-82, IGI Global, Hershey, U.S.A., February, 2008, [ISBN 978 1 59904 840 6].
14. Cardoso, M., J. V. Carvalho and I. Ramos (2008). "Open Innovation Communities...or should it be 'Networks'?", in Miltiadis D. Lytras and Patricia Ordóñez de Pablos (Eds.), WEB 2.0: The Business Models, Springer Science and Business Media, LLC, USA. <http://www.springerlink.com/index/1396626v72j8709.pdf>
15. Ramos, I., and J. A. Carvalho (2008). "Constructionist Perspective of Organizational Data Mining", in John Wang (Ed.), Data Warehousing and Mining: Concepts, Methodologies, Tools, and Applications, Information Science Reference, IGI Global, Hershey, New York, ISBN 978-1-59904-951-9 (hbk.), ISBN 978-1-59904-952-6 (e-book)
16. Ramos, I. and Carvalho, J.A. (2008) "Organizacional Mind: a new perspective on knowledge management" in Alex Koohang & Keith Harman, Knowledge Management: theoretical foundations, Informing Science Press.
17. Piedade, Beatriz, and M. Y. Santos, "Student Relationship Management: Concept, Practice and Technological Support", Proceedings of the IEEE International Engineering Management Conference (IEMC 2008), Estoril, Portugal, 28-30 June, 2008 (ISBN 978-1-4244-2289-0) (Proceedings indexed by ISI and Scopus).
18. Santos, M. Y., and Amaral, L. "Mining Geo-Referenced Databases: A Way to Improve Decision-Making," in: Data Warehousing and Mining: Concepts, Methodologies, Tools, and Applications, J. Wang (ed.), Information Science reference, Hershey • New York, 2008, pp. 880-912.
19. Piedade, Beatriz, and M. Y. Santos, "Student Relationship Management (SRM): proposta de um sistema para a promoção do sucesso escolar", Proceedings of the 3rd. Iberian Conference on Information Systems and Technologies, Vigo, Spain, 19-21 June, 2008 (ISBN 978-84-612-4474-4).
20. M. Rocha, P. Sousa, P. Cortez and M. Rio. Multiconstrained Optimization of Networks with Multicast and Unicast Traffic. In G. Pvlou et al. (Eds.), Management of Converged Multimedia Networks and Services, 11th IFIP/IEEE International Conference on Management of Multimedia and Mobile Networks and Services (MMNS 2008), Lecture Notes in Computer Science 5274, pp. 139-150, Samos Island, Greece, September, 2008. Springer, ISSN:0302-9743, ISBN:978-3-540-87358-7. (32.6% acceptance rate, ISI WoS-proceedings, DBLP)
21. M.F. Santos, H. Quintela, P. Cortez and J. O. Almeida. An intelligent decision support system for bridge safety assessment based on Data Mining models. In A. Zanasí, A. Gomar, N. Ebecken and C. Brebbia (Eds.), Data Mining IX – Data Mining, Protection, Detection and other Security Technologies, WIT Transactions of Information and Communication Technologies Vol. 40, 2008. WIT Press, UK, ISBN:978-1-84564-110-8. (ISI WoS-proceedings, Scopus)
22. P. Cortez, M. Rio, P. Sousa and M. Rocha. Forecasting Internet Traffic by Neural Networks Under Univariate and Multivariate Strategies. In K. Madani (Ed.), Proceedings of 4th International Workshop on Artificial Neural Networks and Intelligent Information Processing (ANNIIP 2008), pp. 61-71, Funchal, Portugal, May, 2008. INSTICC Press, ISBN:978-989-8111-33-3. (ISI WoS-proceedings, Scopus, <http://hdl.handle.net/1822/8027>)

Other publications National

1. M. Rocha, P. Cortez and J. Neves. Análise Inteligente de Dados – Algoritmos e Implementação em Java. Coleção Tecnologias de Informação, FCA Editora de Informática, Lda. ISBN 978-972-722-278-0. (204 páginas, <http://www.fca.pt>).
2. Santos, Leonel Duarte dos e Luís Alfredo Martins do Amaral, Presença na Internet das câmaras municipais portuguesas em 2007: Estudo sobre Local eGovernment em Portugal, Gávea – Laboratório de Estudo e Desenvolvimento da Sociedade da Informação, Universidade do Minho, Guimarães, 2008. ISBN: 978-972-98921-9-6
3. Santos, Leonel Duarte dos e Luís Alfredo Martins do Amaral, Presença na Internet das juntas de freguesia portuguesas em 2006: Estudo sobre Local eGovernment em Portugal, Gávea – Laboratório de Estudo e Desenvolvimento da Sociedade da Informação, Universidade do Minho, Guimarães, 2008. ISBN: 978-972-98921-8-9
4. Beira, E., "Exportações de moldes industriais (III): Portugal (2007) e a União Europeia, tendencias e dinamicas", O Molde, nº 77, March 2008, pg. (in portuguese) (Industrial moulds exports (III): Portugal (2007) and European Union, trends and dynamics)
5. Santos, H. D. and Magalhães, S. T., Será seguro e viável? Biometria no sector Financeiro, in Interface Banca & Seguros, nº 150, Julho de 2008, pp. 43-45.
6. Cardoso, E. L., Pimenta, P., Pereira, D. C., "Adopção de Plataformas de e-Learning nas Instituições de Ensino Superior – modelo do processo", Revista de Estudos Politécnicos, ISSN:1645-9911, 2008, Vol. VI, nº 9, Junho de 2008, págs. 163-182.
7. R. Marques, A. Correia, P. Cortez. DATA MINING no GUIDE TERRASSEMENTS ROUTIERS. Actas do XI Congresso Nacional de Geotecnia - A

Group Productivity

- Geotecnia Portuguesa e os Desafios da Globalização, Volume III, pp. 285-291, Coimbra, Portugal, Abril, 2008, ISBN: 978-989-95740-2-1 (artigo completo).
8. P. Cortez, R. Marques e A. Correia. Artificial intelligence applied to compaction rules and management. Presented in the International Seminar on Interaction soil-rail track for high speed railways - Geotechnical Aspects, LNEC, Lisboa, Portugal, Setembro, 2008 (comunicação convidada, resumo estendido).
 9. Piedade, Beatriz, e Maribel Yasmina Santos, "Adopção do conceito e da prática de SRM (Student Relationship Management) nas instituições de ensino superior", Actas da 8ª Conferência da Associação Portuguesa de Sistemas de Informação (CAPSI 2008), Setúbal, 29-31 Outubro, 2008.
 10. Sobral, S. R., Pimenta, P. "O MOODLE como Ferramenta de Apoio à Algoritmia", CAPSI 2008, Setúbal, 29-31 de Outubro de 2008.
 11. Tavares, A. and Amaral, L. (2008) Como usar redes P2P autenticadas em contexto académico? In 8ª CAPSI - Conferência da Associação Portuguesa de Sistemas de Informação. Setubal.
 12. Garrido, P., Faria, N., (2008) "Design of a Social Decision Support System for Organizations". In Proceedings of CONTROLO'2008 - The 8th Portuguese Conference on Automatic Control, Vila Real, Portugal.

Master and Ph.D. thesis completed

PhD thesis completed

1. Miguel Brito, "Gestão de Conhecimento Organizacional e Maturidade do Processo de Software".
2. Álvaro Silva, "Modelos de Inteligência Artificial na Análise da Monitorização de Eventos Clínicos Adversos, Disfunção/Falência de Órgãos e Prognóstico do Doente Crítico".
3. Paulo Alexandre Vara Alves, "E-generation – Especificação de uma arquitectura para Intranets educacionais baseada em agentes".
4. Sónia Cristina Rolland de Lima Sobral, "Modelo de ensino-aprendizagem para disciplinas introdutórias de programação".
5. Alexandre Bragança, "Methodological Approaches and Techniques for Model Driven Development of Software Product Lines".

Master thesis completed

1. Alysso Pires Gonçalves, "Estudos De Utilização De Portais Situados Na Universidade Do Minho".
2. Luis Fernandes, "O Outsourcing nas PME's portuguesas".
3. Ana Cristina Vilela Magalhães, "Compreensão de representações organizacionais baseadas em abordagens BPM".
4. José Luís da Rocha Sousa, "PESI – EPI: Planeamento Estratégico de Sistemas de Informação baseado em Efeitos, Priorização e Interdependência de requisitos, aplicado à segurança de informação".
5. José Carlos Lourenço Martins, "Framework de Segurança de um Sistema de Informação".
6. José Manuel Machado Fernandes, "Desenvolvimento de uma Política de Segurança Organizacional".
7. Armando Cruz, "Data Mining via Redes Neurais Artificiais e Máquinas de Vectores de Suporte".
8. João Paulo da Costa Amado, do mestrado em Sistemas de Informação, "Caracterização dos Utilizadores de Sites Institucionais via Web Mining".
9. Lisete Rito Gaspar, "Modelo para a certificação de sistemas de democracia electrónica".
10. Mário Fernandes. "Gestão de Projectos de Software com QFD e ABC".
11. Sofia Azevedo. "UML Metamodelling and ERP Software Solutions: Experiments with Microsoft DSL Tools".
12. Pedro Borges. "Configuração do RUP com Vista à Simplificação dos Elencos Processuais em PMEs de Desenvolvimento de Software".
13. Nelson Faria, "Amplidir: A social decision support system".

Patents/propotypes

Patents:

1. Carlos Correia, Ricardo J. Machado, Marco Couto, Patrícia Pinto, Paula Monteiro, Sérgio Oliveira, Armando Almeida, Teresa McIntyre, Maribel Santos, Isabel Ramos, Carlos Oliveira. Ubiquitous Analgesia Control System for the Real time Monitoring of Acute and Chronic Pain. U.S. Patent and Trademark Office, U.S.A., filed in Jul/2008.
2. SISTEMA DE APOIO À DECISÃO INTELIGENTE PARA MEDICINA INTENSIVA - INPI – Instituto Nacional de Propriedade Industrial, Processo Nº 20091000016740, Código 0198 (Em curso).

Prototypes:

1. DeGóis

Plataforma Nacional de Ciência e Tecnologia, sistema de gestão de informação curricular dos investigadores portugueses. <http://www.degois.pt>

2. eVote (Sistema de votação electrónica)

Sistema de votação electrónica que cumpre as normas do Conselho da Europa para sistemas de Votação Electrónica pela Internet e foi reconhecido pela CNPD (Comissão Nacional de Protecção de Dados). Tecnicamente a sua arquitectura contempla as principais propostas existentes na literatura científica e em alguns casos inclui aspectos não contemplados nos modelos propostos. <http://www.dsi.uminho.pt/gavea/evote>

3. eDelphi (Sistema de suporte a questionários Delphi com QSort para recolha de informação)

Plataforma de suporte a recolha de dados de trabalhos de investigação baseados em questionários Delphi e Delphi com QSort. <http://www.dsi.uminho.pt/gavea/edelphi>

4. Amplidir: A social decision support system, Demo instance at: <http://ampli.dei.uminho.pt/>

Organization of conferences

Group Productivity

Mini Track "Data Surveillance", 7th European Conference on I-Warfare and Security, Plymouth, UK, 2008.

The role of IS in leveraging the intelligence and creativity of SME's (CreativeSME), Guimarães, Portugal, 21-24 June, 2009.

2nd IEEE Symposium on Industrial Embedded Systems - SIES'2008, Montpellier, France, June, 2008, IEEE IES Press, Piscataway, New Jersey, U.S.A.

5th International Workshop on Model Based Methodologies for Pervasive and Embedded Software - MOMPES'08 (within the 11th European Joint Conferences on Theory and Practice of Software - ETAPS 2008), Budapest, Hungary, April, 2008, IEEE Computer Society Press, Los Alamitos, California, U.S.A.

BPM Lisbon 2008 – International Conference on Business Process Management, Lisbon, Portugal.

Industry contract research

Avaliação CMMi ML3, PT-Inovação, Dec/2008-Out/2009, 100.310 EUR.

Prototipagem do Módulo de Gestão de Projectos da Primavera Business Software Solutions, Primavera Business Software Solutions, Nov/2008-Out/2009, 170.000 EUR.

Internationalization

RG's internationalization evidences include collaborative publications and participation in international consortia that carry out R&D projects. The results in these 2 aspects are reasonable (cf. project and publications lists).

Some effort has been put in order to participate in networks associated to graduate education and training. The RG is involved in the national collaboration program between Portugal and the Carnegie Mellon University (software engineering stream). Other contacts have been established aiming to create (or to adhere to) international graduate programs in the areas of information systems, software engineering and management, and information services.

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 RG members to participate in committees either related to the organization of events or related to international bodies (KISS group includes the National Representatives to IFIP TC8 and TC10); encourage researchers to use their sabbatical leaves to visit other institutions.

Government/Organization contract research

Parecer sobre o Sistema de Informação do Projecto do Cartão do Cidadão, Agência para a Modernização Administrativa, Jan/2008-, 15.000 EUR.

Verificação de conformidade da usabilidade dos sítios Web do Governo e dos serviços e organismos públicos da Administração Central com as normas W3C. Gabinete do Coordenador Nacional da Estratégia de Lisboa e do Plano Tecnológico, Presidência do Conselho de Ministros, Junho de 2008 a Dezembro de 2008.

Future Research**Objectives**

Concerning future research, the group maintains the same objectives of previous report (see section above).

Funding, source, dates

OTELINE-Ontology-based Engineering of Foftware product-lines, €102.156, FCT.

OLDOCAME-On Line, Datum-Oriented Concept nAvigator in a Multi-user Environment, €48.295, FCT.

KnowWledge creation in Interactions that Sustain the Delopement of the Organizacional Memory (WISDOM), €117.166, FCT.

OFELIA - Ambientes abertos federados para a alavancagem de identidade e Autorização, €31.783, FCT.

Pmti-Melhoria da gestão de projectos através de análise transdisciplinar, €53.116, FCT.

SwSim-Análise e Simulação do Impacto dos modelos de desenvolvimento de Soft. Nos contextos de desenvolvimento de Sistemas Embebidos e de Sist. De Informação, €48.297, FCT.

SYMBIOSIS: Symbiotic data mining for personalized filtering applications, €105.031, FCT.

iScholar, €170.568, FCT.

GridClass II - Learning Classifiers Systems for Grid Data Mining, €67.248, FCT.

QuARSIUP-Evaluation and Reference Framework of Information Systems in Portuguese Universities, €14.588, FCT.

Decision-Making Process of E-Consumers: Impact of interface design on perceived value and loyalty, €13.461, FCT.

Distributed computational environments for the conception and production of scientific publications, €25.815,

ISYSM - Integração de novas ferramentas computacionais no estudo e prática da gestão de sistemas de informação, €46.401, FCT.

Sistemas de Autenticação por Biometrias Comportamentais, €68.652, FCT.

SSDAO-Sistema de Suporte ao Desenvolvimento de Arquitecturas Organizacionais, €7.800, FCT.

Group Description

Title of Research Group:	(RG-COMP-Norte-Braga-319-2184) Ubiquitous and Pervasive Computing, Graphics, and Software Methodologies
Principal Investigator:	Adriano Jorge Cardoso Moreira
Main Scientific Domain:	Engenharia Electrotécnica e Informática
Group Host Institution:	Universidade do Minho

Funding, source, dates

Funding, source, dates

- PostCaVET: Post-graduate Systems Development in Cape Verde and East-Timor
Starting/Duration: Aug 2008/36 months
Funding Source: Edulink Program - ACP-EU Co-operation Programme in Higher Education (Contract: 9 ACP RPR 12#20)
Budget: 584.298 Euros
- VirtualActor - Development of a software framework for animating 3D virtual characters, employing partially autonomous virtual actors
Starting/Duration: Jan 2008/30 months.
Funding Source: FCT (2006) (Ref: PTDC/EIA/69236/2006)
Budget: 112.000 Euros
- BIOMOTION: Perception of biological motion – integrating psychophysics, neurophysiology and computational modelling
Starting/Duration: Apr 2008/ 36 months.
Funding Source: FCT (Ref: PTDC/SAU-BEB/68455/2006)
Budget: 118.799 Euros
- Development of a sketch-based instructional laboratory for Digital Arts and Computer Graphics
Starting/Duration: Sep 2007/ 36 months.
Funding Source: HP Technology for Teaching Grant Initiative (ID: 11446121)
Budget: 70.000 USD
- Pellisaquae-VIS: Visualização Gráfica na Monitorização de Dados em Hidrocinesiterapia
Starting/Duration: Jan 2006/ 30 months
Funding Source: AdI (ADI/2005/M2.3/0022)
Budget: 45.000 Euros

Objectives & Achievements

Objectives

The objectives of the group for the period 2007-2010 have been defined as follows:

- To produce world-class research results and become an international reference in the areas addressed by our research programs, more specifically urban computing, situated displays and systems software for ambient intelligence
- To consolidate the role of multi-disciplinary research as a key driver for our own work, and especially for the structuring of our collaboration networks.
- To collaborate with other players in academia, industry and society to create sustainable, long-term deployments and infrastructures from which new communities of practice and open innovation may emerge, possibly within the framework of living labs.
- To extend our international links by integrating long-term international research initiatives, participating in training networks, and collaborating in the organization of events.
- To consolidate and internationalize our advanced training activities, both at MSc and PhD level, in order to sustain our own need for high-quality researchers and contribute towards the availability of professionals with competences in this area.

Emotion graphics are defined by all type of computer graphics that enable the participatory interactivity with semantic elements and that privileges newer forms of interaction such as physiological sensing and image processing. As a scientific endeavour, it has fostered such diverse areas as multimedia, virtual environments and characters, affective computing, entertainment computing, interactive interfaces and complex simulations (medical, military, artistic and educative).

Further information about the activities of this group and research programs is available at: <http://ubicomp.algorithmi.uminho.pt> and <http://www.engagelab.org>

Main Achievements

Considering the above objectives that have been set for this group in its current format (January 2007), the main achievements are related with the consolidation of the group and its base activity.

More specifically:

- The group has defined three research programs that set the long-term research strategy of the group: Urban computing, Systems Software for Ambient Intelligence and Situated Displays for Smart Places.

Objectives & Achievements

- The group has created a new web site and a blog that improves the ability of the group to communicate its activity to multiple parties.
- The group began a program of weekly seminars which has become an important element for fostering the identity of the group, promoting joint work, and promoting interactions between all its members, with particular emphasis on PhD students.
- The group was actively involved in the creation of a new international conference with a regional (Iberian) focus, which aims to become a relevant conference at European level, while being a privileged forum for the creation of proximity-based collaboration networks. The first of these joined events – the 4th Symposium of Ubiquitous Computing and Ambient Intelligence 2009 - is scheduled to October 2009 and will be hosted by the University of Coimbra.
- The group has improved its internationalisation record (see below).
- The group has improved its publications record, including publications in high quality Conferences and Journals.
- The group started regular research collaboration with a few international research institutions (see internationalization).
- Members of this group have also been very active in promoting education and advanced training courses within their scientific areas of research, namely the MScs in Informatics, Computer Networks and Services, Technology and Digital Arts, the Integrated MSc in Communications Engineering, courses in Ubiquitous Systems, and the PhD Programmes in Telecommunications and Computer Science.

Group Productivity

Publications in peer review Journals

Indexed by ISI or SCOPUS

- Elizabeth Carvalho, Adérito Marcos, Maribel Yasmina Santos, João Espregueira-Mendes, "A Prototype for Cartographic Human Body Analysis", IEEE Computer Graphics and Applications, vol. 28, no. 5, pp. 16-21, Sept/Oct, 2008. (doi.ieeecomputersociety.org/10.1109/MCG.2008.88) (2007 ISI JCR 1.398 Impact Factor);
- Elizabeth Carvalho, Adérito Marcos, Maribel Yasmina Santos, João Espregueira-Mendes and Rogério Pereira, "Using a cartographic model to assist medical diagnoses", International Journal of Computer Assisted Radiology and Surgery, Springer, vol. 3, no. 1-2, June 2008, Springer Berlin / Heidelberg, pp. 41-53 (doi:10.1007/s11548-008-0155-3).
- Rui José, Nuno Otero, Shahram Izadi and Richard Harper. Instant Places: Bluetooth presence and naming as enablers for situated interaction and user generated content in public displays, IEEE Pervasive Computing. Special issue on Pervasive User-Generated Content, Oct-Dec 2008 Indexed by Scopus, Indexed by ISI, Impact Factor:2.293 (ISI-JCR2007), Ranked 2 out of 66 in Telecommunications (ISI rank by Impact Factor).
- Maria J Nicolau, Antonio Costa, Joaquim Macedo, Alexandre Santos. Class Based Multicast Routing in Inter-domain Scenarios, Special issue of Springer/Annals of Telecommunication on Inter-Domain Routing and QoS over Heterogeneous Networks, Vol. 63, No. 11-12, Nov-Dec 2008, Springer Paris. Indexed by Scopus, Indexed by ISI.

Other publications International

Indexed by ISI or SCOPUS

- Iurgel, I. (2008): VirtualActor: Endowing Virtual Characters with a Repertoire for Acting. In: ICIDS 2008: Interactive Storytelling. First Joint International Conference on Interactive Digital Storytelling. Erfurt, Germany, November 26-29, 2008, Proceedings. Spierling, Ulrike; Szilas, Nicolas (Eds.) Series: Lecture Notes in Computer Science, Vol. 5334. 2008, p. 89-91. ISSN: 0302-9743.
- Rui José and Francisco Bernardo. "Extended Bluetooth naming for empowered presence and situated interaction with public displays". 3th Symposium of Ubiquitous Computing and Ambient Intelligence 2008. University of Salamanca, Spain. 22-24th October, 2008. Indexed by Scopus.
- Nuno Vasco Lopes, Maria João Nicolau, Alexandre Santos. Efficiency of PRI and WRR DiffServ Scheduling Mechanisms for Real-Time Services on UMTS Environment, 2nd IFIP International Conference on New Technologies, Mobility and Security (NTMS 2008), Tangier, Morocco, Nov 5-7, 2008. Indexed by Scopus.

Not indexed by ISI or SCOPUS

- Martinho J., Sousa J, Branco P, Marcos A., "You Move You Interact: a full-body dance in-between reality and virtuality", In Proc. of Artech 2008 – 4th International Conference on Digital Arts, 7-8 Nov. 2008, Universidade Católica Portuguesa, Escolas das Artes, Porto. ISBN: 978-898-95776-3-3.
- Carvalho, E., Marcos A., Santos M., Espregueira-Mende, J., Pereira R., "Medical Diagnoses with a Cartographic Oriented Model", In Proc. of 11th AGILE International Conference on Geographic Information Science 2008, 5-8 Maio, Girona, Espanha, 2008.
- Marcos A., Branco P., Valbom L., "Artech: a framework for a common informational space for digital art", In Proc. of 5º Congresso Luso-Moçambicano de Engenharia, 2-4 Set. 2008, Maputo, Moçambique.
- António Costa, Maria J Nicolau, Joaquim Macedo, Alexandre Santos, "QoS Aware Multicast Routing Protocols Evaluation through Simulation", 1st International Workshop on the Evaluation of Quality of Service through Simulation in the Future Internet (QoSSim 2008), ACM Digital Library, ISBN 978-9799-20-2, Marseille, France, Mar 3, 2008.
- Dag Sverre Syrdal, Nuno Otero, Kerstin Dautenhahn. " Video Prototyping in Human Robot Interaction: Results from a Qualitative Study". ECCE 2008 (European Conference in Cognitive Ergonomics 2008). Madeira, 16-19 September 2008.
- Carvalho, Elizabeth, Adérito Marcos, Maribel Yasmina Santos, João Espregueira-Mendes e Rogério Barbosa Pereira, "Medical Diagnoses with a Cartographic Oriented Model", Proceedings of the 11th. AGILE International Conference on Geographic Information Science, Girona, Spain, 5-8 May, 2008.
- Francisco Lemos, Nuno C. Carvalho, Filomena O. Soares, Celina P. Leão, Tiago Fernandes and Helena Rodrigues, User-centred, dynamic and shared Web sites to support the learning activities for University students - concepts, International Conference on Engineering Education "New Challenges in Engineering Education and Research in the 21st Century" (ICEE2008), Pécs-Budapest, Hungary, 27-31 July 2008.
- Iurgel, Ido, and Maribel Yasmina Santos, "Advanced clustering analysis for environmental indicators", Proceedings of the NATO Advanced Research Workshop: Geographical Information Processing and Visual Analytics for Environmental Security, Invited Paper, Trento, Italy, 13-17 October, 2008
- Cardoso, E., Branco, P., Moreira, M. A. I'm a creative not a programmer! Computer programming for artists supported by tabletPCs. in Proceedings of the International Conference e-Learning, Baltics, Rostock, Germany, 2008.

Group Productivity

- Iurgel, I. (2008): VirtualActor: Endowing Virtual Characters with a Repertoire for Acting. In: ICIDS 2008: Interactive Storytelling. First Joint International Conference on Interactive Digital Storytelling. Erfurt, Germany, November 26-29, 2008, Proceedings. Spierling, Ulrike; Szilas, Nicolas (Eds.) Series: Lecture Notes in Computer Science, Vol. 5334. 2008, p. 89-9

Other publications National

- Urbano, C., Magalhães, L., Moura P., Marcos A., "Visualização de Imagens HDR em Dispositivos de Ecrã Pequeno", In Proc. of Interação 2008 – 3ª Conferência Nacional em Interação Homem-Máquina, Évora, 15-17 Out. 2008. ISBN: 972-98464-9-9.
- Martinho, J., Sousa J., Branco P., Marcos A., "You Move You Interact: Developing a dancing performance system for full body interaction", In Proc. of Interação 2008 – 3ª Conferência Nacional em Interação Homem-Máquina, Évora, 15-17 Out. 2008. ISBN: 972-98464-9-9.
- Nuno Otero and Rui José. Displaying Bluetooth presence on public screens: investigating its effects on Bluetooth usage and situated interactions, 3ª Conferência Nacional em Interação Pessoa-Máquina (Interação 2008). Évora, Portugal. 15-17 October 2008.
- Sylla, C., Branco, P., Finalmente Limpinho! Interface física para os meus primeiros contactos com a higiene oral. Interação 2008, 3ª Conferência Nacional em Interação Pessoa-Máquina, Universidade de Évora, 15-17 Outubro, 2008.

Master and Ph.D. thesis completed

PhD thesis

- Elizabeth Simão Carvalho. Tema: CHUB: Um Modelo Cartográfico para a Visualização e Análise do Corpo Humano. Tese defendida: 04.11.2008 na Universidade do Minho. Co-orientadores: Maribel Yasmina Santos, Dep. Sistemas de Informação, Universidade do Minho; João Espregueira-Mendes, Escola de Ciências da Saúde. Orientador: Adérito Fernandes Marcos
- Hélder Manuel da Silva Pinto, An activity-centered ubiquitous computing framework for supporting occasional human activities in public places. Doutoramento (PhD) em Tecnologias e Sistemas de Informação, University of Minho, 2008.
- Filipe Miguel Lopes Meneses, Gestão do contexto em sistemas ubíquos. Doutoramento (PhD) em Tecnologias e Sistemas de Informação, University of Minho, 2008.

Master thesis

- Marco Aurélio Amaro Oliveira, Acesso Distribuído e Inter-operável à Informação Geográfica para Suporte à Gestão de Infra-estruturas Críticas. MSc in Information Systems, University of Minho, 2008.
- Sérgio Joaquim da Silva Oliveira, Estudo sobre a aplicabilidade de códigos visuais. MSc in Mobile Systems, University of Minho, 2008.
- Rui Manuel Martins Marques Rodrigues, Visualização de Paisagens Bluetooth. MSc in Mobile Systems, University of Minho, 2008.
- Luís Pedro Abreu Pereira, IP sobre Redes Ópticas - Engenharia de Tráfego sobre Redes baseadas em Optical Cross-Connects. Mestrado Integrado em Engenharia de Comunicações, University of Minho, 2008.

Patents/propotypes

Patent: Moreira, A. e M.Y. Santos, PCT/IB2008/050849: "Process for the automatic calculus of the convex or concave hull of an arbitrary set of points". Request submitted in March, 7th, 2008 (this patent resulted from work developed within the LOCAL project).

Organization of conferences

- Adérito Marcos, member of the program committee of "Digital Games 2008", Porto, 6-7 Nov. 2008.
- Ido Iurgel, member of the program committee of International Conference IVA – Intelligent Virtual Agents (2005 - 2008). Proceedings published as Springer LNCS - Lecture Notes in Computer Science. ISSN: 0302-9743.
- Adérito Marcos, member of the program committee of "GRAPP 2006 - International Conference on Computer Graphics Theory and Applications", Universidade da Madeira, Funchal, 22-25 Jan. 2008.
- Adérito Marcos, member of the arts committee of "International Symposium on Computational Aesthetics in Graphics, Visualization, and Imaging", Carcavelos, Lisboa, 18-20 Jul. 2008.
- Adérito Marcos, member of the program committee of "Interação 2008 – 3ª Conferência Nacional em Interação Pessoa-Máquina", Évora, 15-17 October 2008.
- Adérito Marcos, Curator of the local arts program of "International Symposium on Computational Aesthetics in Graphics, Visualization, and Imaging", Carcavelos, Lisbon, 18-20 Jul. 2008.
- Adérito Marcos, member of the program committee of "9th VAST International Symposium on Virtual Reality, Archaeology and Cultural Heritage", Braga, 2-6 Dezembro 2008.
- Adérito Marcos, member of the technical committee of "RPD 2008- Rapid Product Development", Marinha Grande, 27-31 October 2008.

Industry contract research

- TellMe, funded by company Digitalbrain; Jan07-Feb08; 28.000 €
- Projecto Pagamentos Móveis 2.0, funded by Centro de Excelência em Desmaterialização de Transacções (CEDT); 2008-????.

Internationalization

Adérito Marcos member of the Executive Board of the Eurographics Association. Since Oct. 2008.

Adérito Marcos, President of International Steering Committee Artech, international academic board responsible for organization of the Artech conference series. Since Oct. 2007.

Adérito Marcos, member of the Advisory Board and Board of Trustees of the INI-GraphicsNet Foundation. Since 2000 until 2008. Re-elected for the Board of Trustees until 2012.

Adérito Marcos, scientific advisor of the European Commission (7 Framework; EPOCH NoE (FP6-IST-507382 – EPOCH); CASPAR IP

Group Productivity

(IST-2006-033572). Since Oct. 2005.

The group has been involved in several collaboration activities with recognised international research groups which offer the group opportunities for intensify international. Those include cooperation with international groups such as:

- The Microsoft Research Lab in Cambridge, UK, in the area of Situated Displays for Smart Places, with Richard Harper and Shahram Izadi.
- The Future Interaction Technology (FIT) laboratory at University of Swansea, UK, and Department of Computer Science, University of Waikato, New Zealand in the area of Context-aware systems and Context-aware Applications, with George Buchanan and Annika Hinze.
- Sheffield-Hallam University, UK, with Ann Light and CNRS - France Telecom, France with Beatrice Cahour in the area of User Experience Methodologies.
- The Pervasive Interaction Lab, Computing Department, Open University, UK with Professor Yvonne Rogers in the area of Human-Computer Interaction in a World Embedded with Ubiquitous Computer Technologies – Research network submitted to ESF.
- The Laboratorio de Tecnologías de la Información Geográfica at the Universidad Politécnica de Madrid, Spain and University of Wageningen, Netherlands in the area of Urban Computing and Exploratory Data Analysis (Spatial data analysis).
- The Institute of Media Design of the University of Arts Linz (Kunstuniversität Linz), Austria in the field of Digital and Interactive arts in order to design a joint doctoral program in this field.

Results:

- Rui José, et al. Instant Places: Bluetooth presence and naming as enablers for situated interaction and user generated content in public displays, IEEE Pervasive Computing. Special issue on Pervasive User-Generated Content, Oct-Dec 2008

Future Research

Objectives

Concerning future research, the group maintains the same objectives of previous report (see section above).

Funding, source, dates

Current funding:

- Web Security and Privacy: Weaving Together Technology Innovation with Human and Policy considerations, funded by Carnegie Mellon Portugal (CMU-PT/SE/0028/2008); Mar09- Feb12; 382.106 € (Global) 81.670 € (UMinho).
- Mobi_Guimarães POVT, consortium headed by the Município de Guimarães; partners: University of Minho; DST SGPS, SA; Petrotec - Assistência ao Ramo Petrolífero, SA; CEIIA - Centro para a Excelência e Inovação na Indústria Automóvel; and INTELI - Inteligência em Inovação, Centro de Inovação. Project funded by POVT from QREN; 2009-2012 (3 years). Total funding budget unknown.
- DATACAR 2010, collaboration of ubicomp@uminho with CCG, in the scope of a contract between CCG and the company AMI -Tecnologias para transportes. Project financed by QREN. April 2009-April 2010. Total funding budget unknown.

...

Pending funding:

- AnyWhere Places: Situation-aware system support for Ambient Intelligence applications, submitted to FCT, Feb. 2009, Total budget: 95.793,00€
- InFlows- Modeling flows of people moving together in space, submitted to FCT, Date: February 2009, Total budget: 108.828,00€, UM funding: 108.828,00€
- Instant Places, submitted to FCT, Feb. 2009, Total budget: 114.351,00€
- EduDynamics – Human motion dynamics in extended academic environments, submitted to FCT, Feb. 2009, Total budget: 129.588,00€
- Roads4IPNG-Routing Architectures and moDeIS for IP Next Generation, submitted to FCT, Date: Feb. 2009, Total budget: 105.276,00€
- Processamento de Sinais Sociais em Interação Humano-Computador, submitted to FCT, Feb. 2009, Total budget: 156.235,00€
- CHIMPS-Interação Pessoa Máquina com sinais físicos e fisiológicos humanos, submitted to FCT, Feb. 2009, Total budget: 196.959,00€

Group Description

Title of Research Group:	(RG-COMP-Norte-Braga-319-2959) Industrial electronics
Principal Investigator:	Carlos Alberto Caridade Monteiro e Couto
Main Scientific Domain:	Engenharia Electrotécnica e Informática
Group Host Institution:	Universidade do Minho

Funding, source, dates

Funding, source, dates

1. EU, JAST IST-2-003747-IP; 2004-2009; (560.000€ + 60.000€)/6.000.000 M€.
2. EU-IST: HYDRACT;2008 - 2010;
3. FCT POCI/V.5/A0119/2005; 2007-2008; 64.521€/64.521€.
4. FCT POCTI/EME/61425/2004 Partners: DEM; 2008; 33 000,00 €
5. FCT POCTI/ESE/48242/2002; 2004-2008; 30.000€.
6. FCT PTDC/EEA-TEL/68625/2006, 2007-2010, 86.090€
7. FCT PTDC/EEA-ENE/66855/2006, 2007-2010, 120.000€
8. FCT PTDC/ESC/68069/2006 – Partners: DPS;2008-2010; 70000€
9. FCT PTDC/BIO/70017/2006; 2007-2010; 83 000,00 €
10. QREN - Partners: SAR, Partis Consulting, Concurso 2007/1583; ;152,980EUR/442,300€.
11. QREN - Partners: ENERMETER and InescPorto; 2008-2010; 246.685€.
12. QREN - Partners: TecMinho and Edaetech; 2008 -2009; .
13. ADI-PRIME, Project SINUS, DEMTEC/020/1/03; 2005-2008; 706.488€.
14. ADI-NEOTEC; 2008 - 2010; .
15. Programa Ciência Viva 2008-28/373, "RoboParty 2008"; 2008; 7.840€/7.840€.
16. Programa Ciência Viva, Science in the City of Guimarães; 2007-2008; 140.000€;

Objectives & Achievements

Objectives

This group congregates a relatively large number of researchers organized in 5 areas: 1-Mobile and Anthropomorphic Robotics; 2-Automation, Control and Instrumentation; 3-Energy and Power Electronics; 4-Embedded Systems; 5-Communications Systems and Services. The idea is that the researchers of these areas work in cooperative sub-groups, and that these sub-groups increase in size and competitiveness, becoming autonomous groups in the future.

The main goals for each of the above mentioned areas were:

- 1 - To develop R&D on autonomous and cognitive robotics: autonomous mobile robots, jointly-acting autonomous systems (robot-robot, human-robot) that communicate and work intelligently on mutual tasks (e.g. joint transportation of objects, robotic football, joint construction): i) to build control architectures for multi-robot motion coordination, ii) to build neuron-cognitive inspired architectures that endow the robots with socially intelligent behaviour, iii) to investigate how such systems can be synthesized using methods from the theory of non-linear dynamical systems.
- 2 - Development of solutions requested by industry and by other department/ research groups. The added value was on Mechatronics Systems; Computer Vision and Image Processing; Instrumentation, Acquisition, Automations and Control; and on Multisensor Fusion and Integration using Soft Computing Techniques.
- 3 - To develop R&D 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 - To study, modelling, simulating, and designing concurrent, real-time, embedded systems. The focus is on designing retargetable tools for embedded systems, such as, simulators, assemblers, linkers, debuggers and compilers based on an architecture description language. A major problem addressed was the design of a language capable to describe development tools, such as, full systems simulators, debuggers and compilers.
- 5 - To research on: Wireless Sensor Networks; Integration of Services on the Public Access Network; Real-time Traffic Scheduling Based on Quality of Service; Interfaces and Distributed Applications for Blind-People Virtual Communities.

Main Achievements

The Industrial Electronics Group has published 5 book chapters, 17 papers in International Journals, 40 papers in International Conferences, registered 5 patents, 3 industrial prototypes, completed 6 PhDs and several MScs. The main achievements of the 5 sub-groups are:

- 1 - The group participates on international scientific robotic events (like RoboCup) with positive results, which promotes it internationally. Also belongs to international organization committees.

The Mostra Interactiva de Ciência e Tecnologia had 820 visitors and considerable impact on the media. It was the result of an activity with over 90 students, which originated 20 scientific publications (9 in 2008)..

Objectives & Achievements

- 2- Participation in 5 projects and 2 industrial contracts.
- 3- The successful conclusion of Project SINUS, in which were developed 5 prototypes of Shunt Active Power Filters, tested in real electrical facilities. The equipments developed in this project are now being industrialized by the Portuguese company EFACEC.
- 4- A framework architectural model and a UML profile that supports the specific concepts in embedded systems; Automatic generation of fast retargetable processor simulators (Simulators for ARM and SPARC processors and 8051 microcontroller were generated); Real-time Operating Systems using Aspect Programming; A fault-tolerant middleware for BOSS operating; An IDE for video surveillance systems.

Group Productivity

Publications in peer review Journals

1. C. Santos and M. Ferreira, "Timed Trajectory Generation using Dynamical Systems: Application to a Puma Arm", *Robotics and Autonomous Systems* (2008), doi: 10.1016/j.robot.2008.05.002 (available on line 15 May 2008) IP = 0.633, C= 0 [ISI]
2. Ferreira, Manuel J; Santos, Cristina P and Monteiro, João "Cork Parquet Quality Control Vision System Based on Texture Segmentation and Fuzzy Grammar", *IEEE Transactions on Industrial Electronics*, Vol.: 56, Issue: 3, doi: 10.1109/TIE.2008.2011619, 2008 (in press). IP = 2.216, C= 0 [ISI]
3. João L. Vilaça, Jaime C. Fonseca and António M. Pinho, "Calibration Procedure for 3D Measurement Systems Using Two Cameras and a Laser Line", *Optics and Laser Technology* (2008), doi:10.1016/j.optlastec.2008.05.012. IP=0.872, C=0 [ISI]
4. Filomena Oliveira Soares, M. Belsley, Vitor Carvalho, Rosa Vasconcelos, "Yarn Diameter Measurements Using Coherent Optical Signal Processing", *IEEE Sensors Journal*, Vol. 8, Issue 11, pp.1785-1793, Novembro 2008. doi: 10.1109/JSEN.2008.2005231. IP=1.34, C=0 [ISI]
5. Filomena Oliveira Soares, M. Belsley, Vitor Carvalho, Rosa Vasconcelos, "Yarn Hairiness Characterization Using Two Orthogonal Directions", *IEEE Transactions on Instrumentation and Measurement*, doi: 10.1109/TIM.2008.2005082, Dezembro 2008. IF=0.832, C=1 [ISI]
6. Filomena Oliveira Soares, M. Belsley, Vitor Carvalho, Rosa Vasconcelos, "Yarn Hairiness and Diameter Characterization Using a CMOS Line Array", *Measurement*, Vol. 41, Issue 10, pp.1077-10, Dezembro 2008 doi:10.1016/j.measurement.2008.02.010. IF=0.5, C=0 [ISI].

Other publications International

Books:

1. U. Visser, F. Ribeiro, T. Ohashi, F. Dellaert, "RoboCup 2007: Robot Soccer World Cup XI", *Lecture Notes on Artificial Intelligence series*, volume 5001, Springer, Berlin Heidelberg New York, 18 Julho 2008, ISSN: 0302-9743.

Chapters:

2. C. P Santos, M. J Ferreira, "Temporal coordination among two vision-guided vehicles: a nonlinear dynamical systems approach", In Low Kin Huat (Ed), *Computer Vision, Advanced Robotics Systems International*, Edited by: Xiong Zhihui, Publisher: IN-TECH, ISBN 978-953-7619-21-3, November, 2008.
3. P. Carvalhal, C. Santos, M.I J. Ferreira, L. F. Silva and J. A. Afonso (University of Minho), "Design and Development of a Fly-by-Wireless UAV Platform", Book Title: *Intelligent Aerial Vehicles*. Publisher: I-Tech Education and Publishing, Vienna, Austria, Publication date: November 2008
4. J. Sousa, G. Rocha and J. Sena Esteves. *Electromagnetic Shoot. Selected Papers on Hands-on Science*. Costa MF, Dorrió BV, Michaelides P and Divjak S (Eds.); Associação Hands-on Science Network, Portugal. pp. 343-346, 2008. ISBN 978-989-95336-2-2
5. D. Pedrosa, P. Teixeira, J. Crespo, D. Costa and J. Sena Esteves. *Foldable Slewing Crane. Selected Papers on Hands-on Science*. Costa MF, Dorrió BV, Michaelides P and Divjak S (Eds.); Associação Hands-on Science Network, Portugal. pp. 531-541, 2008. ISBN 978-989-95336-2-2
6. Pedro Rodrigues, Manuel Ferreira, and João Monteiro. "Quantum Computation Perspectives in Medical Image Processing". *Handbook of Research on Developments in e-Health and Telemedicine: Technological and Social Perspectives*. IGI Global, 2008.

Journals (without ISI impact factor):

1. Ferreira, Manuel J; Santos, Cristina P and Monteiro, João - A Texture Segmentation Prototype for Industrial Inspection Applications Based on Fuzzy Grammar, *Sensor Review*, 2008 (in press).
2. Ricardo Veiga, Raquel Correia and João Sena Esteves; Partitive Mixing of Colours Interactive Device; *International Journal on Hands-on Science* [ISSN (print): 1646-8937; (online): 1646-8945] Received September 20, 2008; Accepted December 26, 2008. Volume 1, Number 2, pp. 70-75, December 2008.
3. Fernando Ribeiro, Luca Tosini, Gil Lopes, "Localization of a Mobile Autonomous Robot Based on Image Analysis", *Revista Robótica*, nº. 70, 1º trimestre 2008, ISSN: 0874-9019, pag. 12-16.
4. João L. Vilaça, Jaime C. Fonseca and António M. Pinho, "Non-contact 3D acquisition system based on stereo vision and laser triangulation", *Machine Vision and Applications Journal*. Accepted for publication.
5. Filomena Oliveira Soares, M. Belsley, Vitor Carvalho, Rosa Vasconcelos, A Comparative Study Between Yarn Diameter and Yarn Mass Variation Measurement Systems Using Capacitive and Optical Sensors, *Indian Journal of Fibres & Textile Research*, Vol. 33, June 2008, pp.119-125 (impact factor: 0.350)
6. J. Machado, E. Seabra, J. Campos, Filomena Oliveira Soares, C. P. Leão, J. Ferreira da Silva, Simulation and formal verification of industrial systems controllers, *ABCM Symposium Series in Mechatronics - Vol. 3 - pp.461-470*, 2008,
7. V. Carvalho, M. Belsley, R. Vasconcelos, Filomena Oliveira Soares, Automatic Yarn Characterization System: Design of a Prototype, (accepted for publication in *IEEE Sensors Journal*).
8. V. Carvalho, P. Cardoso, M. Belsley, R. Vasconcelos, Filomena Oliveira Soares, Yarn Diameter Characterization Using Two Orthogonal Directions, (accepted for publication in *Journal Experimental Techniques*).
9. V. Carvalho, P. Cardoso, M. Belsley, R. Vasconcelos, Filomena Oliveira Soares, Yarn Irregularity Parameterization Using Optical Sensors, (accepted for publication in *Fibres and Textiles on Eastern Europe*).
10. Pedro Portela, João Sepúlveda, João Sena Esteves - Alternating Current and Direct Current Generator. *International Journal on Hands-on Science* [ISSN (print): 1646-8937; (online): 1646-8945]. Received July 21, 2008; Accepted September 3, 2008. Volume 1, Number 1, pp 44-46, September 2008.
11. Nino Pereira, Hélder Castro, João Sepúlveda, João Sena Esteves - Computer-Controlled Model Railroad. *International Journal on Hands-on*

Group Productivity

Science [ISSN (print): 1646-8937; (online): 1646-8945]. Received September 10, 2008; Accepted December 26, 2008. Volume 1, Number 2, pp 76-79, December 2008.

12. Delfim Pedrosa and João Sena Esteves; Handmade Series Direct Current Motor; International Journal on Hands-on Science [ISSN (print): 1646-8937; (online): 1646-8945] Received July 14, 2008; Accepted September 3, 2008. Volume 1, Number 1, pp. 40-43, September 2008.

13. Barbosa, D., Ramos, J., Tavares, A. and Lima, C.S. "Detection of Small Bowel Tumors in Endoscopic Capsule Images by Modeling Non-Gaussianity of Texture Descriptors", International Journal of Tomography & Statistics, Special Issue on Image Processing, Accepted for publication.

Conference proceedings (International conferences):

1. E. Bicho, L. Louro, N. Hipólito, W. Erlhagen "A dynamic neural field architecture for flexible and fluent human-robot interaction", in Proceedings of the 2008 International Conference on Cognitive Systems (CogSys 2008), pp.179-185 University of Karlsruhe, Alemanha, 2-4 April, 2008.

2. S. Monteiro, E. Bicho, "Robot formations: robots allocation and leader-follower pairs", in Proceedings of the 2008 IEEE International Conference on Robotics & Automation (ICRA 2008), pp.3769-3775, Pasadena, Califórnia, USA, 18-23 May, 2008.

3. M. E. Foster, M. Giuliana, T. Müller, M. Rickert, A. Knoll, W. Erlhagen, E. Bicho, N. Hipólito and L. Louro "Combining Goal Inference and Natural-Language Dialogue for Human-Robot Joint Action", in Proceedings of the 1st International Workshop on Combinations of Intelligent Methods and Applications (CIMA 2008) in conjunction with the 18th European Conference on Artificial Intelligence (ECAI 08), 6 pages, Patras, Grécia, 21-22 July, 2008.

4. D. M. Ferreira, A. F. Ribeiro, J.G. Rocha, J.P. Carmo, "Analysis and Development of a Localization System Based on Radio Frequency", IEEE International Symposium on Industrial Electronics (ISIE'2008), 30 June - 2 July 2008, ISBN 978-1-4244-1666-0, Cambridge, United Kingdom, pp. 1441-1445.

5. F. Ribeiro, "Building a robot to use in school - teachers and students learning together", 5th international conference on Hands on Science, 13-17 October 2008, Espaço Ciencia, Olinda, Brasil, ISBN: 978-989-95095-3-5, pp. 161-169.

6. L. Castro, C. P. Santos, M. Oliveira and A. Ijspeert; "Postural Control on a Quadruped Robot using lateral tilt: a Dynamical System approach", European Robotics Symposium 2008 (EUROS 2008), EURON II Annual Meeting, Book series: Springer Tracts in Advanced Robotics, Publisher: Springer Berlin / Heidelberg, ISSN: 1610-7438 (Print) 1610-742X (Online), Volume 44/2008, Book European Robotics Symposium 2008, doi: 10.1007/978-3-540-78317-6_21, ISBN: 978-3-540-78315-2, pp. 205-214, Diplomat Hotel Prague Czech Republic, 26-27 Mars, 2008.

Master and Ph.D. thesis completed

PhD thesis completed:

- João Luis Araújo Martins Vilaça, " Sistema de Comando e Informação Flexível para Maquinas 3D ", Supervisors: Jaime Fonseca e António Pinho, 24 November 2008.

- Gustavo Vasconcelos Arnold, " Automation of the Code Generation for Different Industrial Robots", Supervisors: Jaime Fonseca and Pedro Henriques, 30 July 2008.

- Vitor Hugo Mendes da Costa Carvalho, "Sistema automático de caracterização de fio têxtil", Supervisores: Filomena Oliveira Soares e Rosa M. Vasconcelos. O trabalho de Doutoramento iniciou-se em Outubro de 2004 e foi concluído em 10 Julho de 2008.

- Luís Fernando Corrêa Monteiro, "Contribuições para a Optimização do Desempenho do UPQC – Unified Power Quality Conditioner"; PhD in Electrical Engineering - Federal University of Rio de Janeiro – COPPE-UFRJ (Brazil) – December 2008.

- José Carlos M. Metrôlho, " MiADL: Linguagem para Geração Automática de Simuladores Redirecionáveis", Supervisors: Carlos Alberto Caridade Monteiro e Couto and Carlos Alberto Batista da Silva, 25 June 2008.

- Sérgio Adriano Fernandes Lopes - Architecture and Documentation Integrated Method for the Design and Reuse of Frameworks. October 2008.

Master dissertations completed:

- Rui Silva, Mestrado em Electrónica Industrial da Universidade do Minho, "Design e construção de um robot antropomórfico", Supervisor: Estela Bicho, 17th December 2008.

- Paulo Carvalho, Mestrado em Sistemas Móveis, Engineering School, University of Minho, "Desenvolvimento das arquitecturas de suporte físico e lógico necessárias para os sistemas de recolha e transmissão de dados num UAV", Supervisor: Cristina M. Peixoto dos Santos, 22 January 2008.

- Emanuel Augusto de Freitas Sousa, Mestrado Integrado em Engenharia Electrónica Industrial e Computadores, Industrial Electronics Department, Engineering School, University of Minho, "Learning in a Dynamic Field based architecture for human-robot interaction: a Hebbian perspective", Supervisor: Estela Bicho, 16 October 2008.

- Miguel Oliveira, Mestrado Integrado em Engenharia Electrónica Industrial e Computadores, Industrial Electronics Department, Engineering School, University of Minho, "A combined Approach for Head Motion Stabilization using Central Pattern Generators and a Genetic Algorithm", Supervisor: Cristina M. Peixoto dos Santos, 26 October 2008.

- Paulo Ricardo Neves Carvalho, "Reconhecimento de Apito em ambientes ruidosos", Mestrado Integrado em Electrónica Industrial e Computadores. Supervisors: Fernando Ribeiro.

- Filipe Campos Meira Castro, "Web based interface to control a wireless mobile robot", Mestrado Integrado em Electrónica Industrial e Computadores, realizado no APS – European Centre for Mechatronics, Aachen (Alemanha). Supervisors: Fernando Ribeiro.

- Cristiano Diogo Pereira dos Santos, "Projecto Sound-Ether", Mestrado Integrado em Electrónica Industrial e Computadores. Supervisors: Fernando Ribeiro.

- Bruno Guilherme Gonçalves de Matos, "Controlador/Accionador de 3 Motores DC independentes em malha fechada", Mestrado Integrado em Electrónica Industrial e Computadores. Supervisors: Fernando Ribeiro.

- João Luís Neto Guimarães Pereira, "Interface para Sistema de Domótica, Infra-Ether", Mestrado Integrado em Electrónica Industrial e Computadores. Supervisors: Fernando Ribeiro.

- Joaquim Miguel Fonseca da Silva, "Sistema para evitar obstáculo em cadeira de rodas omnidireccional", Mestrado Integrado em Electrónica Industrial e Computadores. Supervisors: Estela Bicho e Fernando Ribeiro.

Group Productivity

Patents/propotypes

Patents:

- Registry of a Commercial Brand or Name for an event called "RoboParty", granted in 31st of July 2008, with No. 410145.
- Portuguese patent no. 103 807, "Fully Autonomous or Remotely Operated Golf Ball Picking System", 13 of January 2008, Authors: Fernando Ribeiro,
- International Patent Request no. PCT/PT2008/000031, "Fully Autonomous or Remotely Operated Golf Ball Picking System", 18 August 2008, Authors: Fernando Ribeiro.
- International Patent request PPI-38263-08, "System for Automatic and Personalized Modelling/Bending of Surgical Prosthesis for Correction of Pectus Excavatum Based on Pre-Surgical Imagyology Information", Setembro de 2008, Authors: João Vilaça, Jaime Fonseca, António Marques Pinho, Jorge Pinto e Nuno Peixinho.
- Provisional registry of National Design or Model n.º 973, "Pasta Solar", granted on June 27, 2008, Authors: Maria da Graça Pinto Ribeiro Guedes, João Miguel Clemente de Sena Esteves and Helder Manuel Teixeira de Carvalho.
- J. A. Afonso, J. H. Correia, H. R. Silva, L. A. Rocha, "BODY KINETICS MONITORING SYSTEM", Internacional Patent WO/2008/018810, Publication Date: 14.02.2008.

Prototypes:

- Development of 5 robot soccer players based on the Robocup event rules (2008) with new: a) vision system, b) actuators and motor control, c) lightweight body polymer based, d) software and game strategy.
- Development of a new mobile robot for autonomous driving to participate at the Condução Autónoma competiton of the Festival Nacional de Robótica event, 2009 edition, with improved mechanical steering system, new control hardware and new software.
- MPPT Circuit (Maximum Power Point Tracker -) used with Photovoltaic Solar Panels – Input Voltage: 100 V to 450 V – Output Voltage: 450 V, Nominal Power: 4 kVA.

Organization of conferences

- Development of a new mobile robot - Roboparty 2008 event, 2nd Edition, University of Minho, 14-16 March 2008
- Organization Member of the Middle Size League RoboCup Organizing Committee (RoboCup'2008) for the Robocup Conference Proceedings, Suzhou (China) in July 2008.
- Organization member of the 5th International Conference "Hands-on Science - Formal and Informal Science Education", 13-17 October 2008, Olinda, Recife, Brasil. <http://www.hsci.info/hsci2008/hsci2008.html>
- Workshop co-organization with Prof. J. Norberto Pires of Coimbra University, Controlo'2008, "Applications of Industrial and Service Robotics", 21-23 July 2008, UTAD, Vila Real, Portugal.
- Workshop co-organization with Prof. J. Norberto Pires of Coimbra University and Prof. António Paulo Moreira of FEUP, Porto University, "Applications of Industrial and Service Robotics", ICINCO'2008 - 5th International Conference on Informatics in Control, Automation and Robotics, 11-15 May 2008, Funchal, Madeira.
- Mostra Interactiva de Ciência e Tecnologia, Palácio Vila Flor, Guimarães, Portugal, April 14 – 20, 2008.

Industry contract research

- Company :SILGAL, "Célula de Aparafusamento Automático", 2008, Funding: 4.800€
- Company: SBS software – Tecnologia e Serviços de Informática, "Desenvolvimento de uma aplicação de software para a área do retalho com base em tecnologia RFID", 2007-2008, Funding: 70.750,00€
- EFACEC – Industrialization of Active Power Filter developed in Project SINUS, 30.000€ + royalties.
- Company - Juvenescence Medical – Cosmética Médica, SA – "Desenvolvimento de equipamentos destinados à utilização em tratamentos de beleza e estética", 2007-2008, Funding: 5500€.

Internationalization

Graduate Training Networks:

- MIT|Portugal Advanced Program on Bio-Engineering Studies.

Collaborative research:

- Donders Institute for Information, Cognition and Brain Sciences, Dept. of Cognitive Psychology, Radboud University, Nijmegen, Netherlands.
- Technical University of Munich, Germany.
- Honda Research Institut Europe GmbH, Offenbach/Main, Germany;
- Istituto di Fisiologia Umana, University of Parma, Italy.
- Filomena Oliveira Soares, European Erasmus project, in the area of remote collaborative teaching. Partners: Masaryk University, Brno, Czech Republic, University of Aberystwyth, Wales, UK, Stockholm University, Sweden, Technical University of Dresden, Germany, Hartmut Buttner International Management Consulting, Germany, Chamber of Commerce, Zlin, Czech Republic, University of Granada, Spain, University of Minho, Portugal
- Filomena Oliveira Soares, collaboration with Katarina Zakova, Pavol Bistak, Mikulas Hubana da Universidade Tecnica de Bratislava, Eslováquia, in a Erasmus project, in the area of Virtual and Remote Laboratories.
- João Luiz Afonso: COPPE-UFRJ – LEMT – Laboratory of Power Electronics for Medium Voltage of Federal University of Rio de Janeiro, Brazil.
- Adriano José C. Tavares and Carlos Alberto B. Silva: FIRST, Germany.
- "Global Information Infrastructure/Next Generation Networks", "The Research Seminar for Department Communications and Networking", "Helsinki University of Technology", June 2008

Group Productivity

Participation in Networks of Excellence:

EuCognition- European Network for the Advancement of Artificial Cognitive Systems"

EURON- European Network in Robotics.

Participation in European Projects:

- EU, JAST-Joint action Science and Technology, IST-2-003747-IP, 2004-2009.

Participation in Projects of International collaboration:

- FCT, LEMI-Learning to Read the Motor Intention of Others: towards socially intelligent robots, POCI/V.5/A0119/2005, 2007-2008.

Collaborative publications (partial):

- U. Visser, F. Ribeiro, T. Ohashi, F. Dellaert, "RoboCup 2007: Robot Soccer World Cup XI", Lecture Notes on Artificial Intelligence series, volume 5001, Springer, Berlin Heidelberg New York, 18 Julho 2008, ISSN: 0302-9743.

Future Research

Objectives

Future research for each of the covered areas aims at:

1 - Development of socially intelligent robots, i.e. to build dynamic control architectures to endow autonomous robots with the capacity of reading motor intention for human-robot interaction tasks; ii) Development of learning schemes for social robotics; iii) Robots that provide assistance to disabled people; iv) Control architectures for the automatic generation, modulation and planning of complex motor behaviors for legged robots with many DOFs and for movement coordination/cooperation between different platforms.

2 - Development of solutions requested by industry and by other department/ research groups. The added value was on Mechatronics Systems; Computer Vision and Image Processing; Instrumentation, Acquisition, Automations and Control; and on Multisensor Fusion and Integration using Soft Computing Techniques.

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 - Modelling, simulating, and designing concurrent, real-time, embedded systems. The focus is on designing retargetable tools to support design space exploration, such as, simulators, assemblers, linkers, debuggers and compilers based on an architecture description language. A major problem addressed was the design of a language capable to describe development tools, such as, full systems simulators, debuggers and compilers.

Funding, source, dates

Current Funding:

- Industrialization of Active Filters - EFACEC - 30.000,00 €

- ECORAIL - Regenerative Energy in Trains - EFACEC - 60.000,00 €

Pending Funding:

- UPQC-IM-REI - FCT - 161.470,00 €

- SU-GEST-I.E. - FCT - 146.027,00 €

Group Description

Title of Research Group: (RG-COMP-Norte-Braga-319-2976)
Micro/Nanotechnologies and Biomedical Applications

Principal Investigator: José Higinio Gomes Correia

Main Scientific Domain: Engenharia Electrotécnica e Informática

Group Host Institution: Universidade do Minho

Funding, source, dates

Funding, source, dates

-FCT/PTDC/EEA-TEL/65286/2006, MEMS: Micro-Antenna for Wireless Biomedical Devices, 2009 2011, 130.000,00 €.

-FCT/PTDC/BIO/70017/2006, Lab-on-a-chip with fluid acoustic microagitation, 2007- 2010, 83.000,00 €.

-FCT/PTDC/EEA-ELC/70803/2006, BIOSWIM - Body Interface System based on Wearable Integrated Monitorization, 98.381,00 €.

-FCT/PTDC/EEA-TEL/68625/2006 - "Quality of service in wireless sensor and actuator networks", 86.000,00 €.

-FCT/PTDC/EEA-ENE/66855/2006, Thermoelectric energy scavenging microsystem, 2007 2010, 120.000,00 €.

-PTDC/SAU-BEB/68678/2006 - Sense4me - Discomfort monitoring and control system for handicapped, bed rest people and surgery patients, 146603,00 €.

-PTDC/CTM/69362/2006 "POLIFILM - Multifunctional films for flexible and plastic material applications". Project duration: 2007- 2010, 108 000,00 €.

- MAP- MicroAnalizador de Proteínas, ADI/QREN/2008, 161.885,92 €, consórcio: Instituto Agilus, IPO-Porto, Emilio Azevedo de Campos, UM, 2009-2011.

- AHRS – Desenvolvimento de um Sistema Inercial de Orientação, ADI/QREN/2008, 61.749,63 €, consórcio: SpinWorks, INESC-Porto, FEUP, UM, 2008-2010.

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.
- 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.

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 ultrasound system with the new equipment acquired was a priority.

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.

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

Group Productivity

1. J H Correia, Editorial Journal Micromechanics and Microengineering, IOP, Vol. 18, N°6, Guest Editor of special issue of Journal Micromechanics and Microengineering, IOP, pp.1, June 2008. IP=2.499.
2. L. M. Goncalves, C Couto, P Alpuim, J H Correia, Thermoelectric micro converters for cooling and energy-scavenging systems, Journal Micromechanics and Microengineering, IOP, Vol. 18, pp. 1-5, June 2008. IP=2.499.
3. L. M. Goncalves, J G Rocha, C Couto, P Alpuim, J H Correia, On-Chip Array of Thermoelectric Peltier Microcoolers, Journal Sensors and Actuators A, Vol.145-146, pp. 75-80, August 2008, Elsevier Science 2008. IP=1.434.
4. L. M. Gonçalves, C. Couto, J. H. Correia, Optimization of Bi₂Te₃ and Sb₂Te₃ thin films deposited by co-evaporation on polyimide for thermoelectric applications, Vacuum, Vol. 82, pp.1499-1502, Elsevier Science August 2008. IP=0.881.
5. A. V. Fernandes, V. Cardoso, J. G. Rocha J. Cabral, G. Minas, "Smart-Optical Detector CMOS Array for Biochemical Parameters Analysis in Physiological Fluids", IEEE Transactions on Industrial Electronics, Vol. 55, pp. 3192-3200, September 2008. IP=2.216.
6. C. M. Costa, V. Sencadas, J. G. Rocha, "Microscopic origin of the high-strain mechanical response of poled and non-poled poly(vinylidene fluoride) in the beta-phase", Journal of Non-Crystalline Solids, Vol. 354, pp. 3871-3873, January 2008. IP=1.319.
7. G. Botelho, S. Lanceros-Mendez, J. G. Rocha, "Relationship between processing conditions, defects and thermal degradation of poly(vinylidene fluoride) in the beta-phase", Journal Non-Crystalline Solids, V. 354, pp. 72-78, April 2008. IP=1.319.
8. V. Cardoso, P. Martins, J. G. Rocha, "Ultrasonic Transducer based on beta-PVDF for Fluidic Microagitation in a Lab-on-a-Chip device", Advances in Science and Technology, Vol. 57, pp. 99-104, October 2008. IP=?.

Other publications International

- C. P. Figueiredo, N. S. Dias, J. H. Correia, P. M. Mendes, "Wideband Wireless Link for BCI control", BIODEVICES 2008, International Conference on Biomedical Electronics and Devices, pp.202-205, Funchal, Madeira, 28-31 January 2008.
- J. P. Carmo, P. M. Mendes, C. Couto and J. H. Correia, "2.4 GHz Wireless Electronic Shirt for Vital Signals Monitoring", Biodevices 2008, International Conference on Biomedical Electronics and Devices, pp. 162-165, Funchal, Madeira, 28-31 January 2008.
- L. M. Goncalves, H. R. Silva, R. Rocha, P. Alpuim, J. H. Correia, "Thermoelectric thin-films for microcoolers and energy scavenging microsystems", Proceedings of NanoSpain2008, Braga, Portugal, pp. 1-2, April 14-18, 2008.
- L. M. Goncalves, R. Rocha, A F. Silva, J. P. Carmo, P. Alpuim, J.H. Correia, "A human-body thermoelectric energy scavenging microsystem", Proceedings of MME 2008, Aachen, Germany, pp. 49-52, 28-30 September 2008.
- A. F. Silva, F. Goncalves, L. A. Ferreira, F. M. Araujo, I. Dias, P. M. Mendes, J. H. Correia, "Fiber Bragg grating sensors embedded in polymeric foils", Proceedings of MME 2008, Aachen, Germany, pp. 327-330, 28-30 September 2008.
- N. S. Dias, P.M. Mendes, J. H. Correia, "Feature Selection for Brain-Computer Interface", IFMBE Proceedings, Antwerp, Belgium, vol.22, pp. 318-321, 23-27 November 2008.
- C. P. Figueiredo, N. S. Dias e Paulo Mateus Mendes, "3D Localization for Biomedical Wireless Sensor Networks Using a Microantenna", 38th European Microwave Conference 2008, (EuWiT), Amsterdam, Netherlands, 28-29 October 2008.
- L. A. Rocha, P. M. Mendes, "A SOI Microfabricated Antenna", 22nd International Conference EUROSENSORS, Germany, Dresden, 07-10 September 2008.
- L. A. Rocha, P. M. Mendes, "Electrically Small MEMS Antenna for Wireless Biomedical Microsystems", 38th European Microwave Conference 2008 (EuMC), Amsterdam, Netherlands, 28-29 October 2008.
- N. S. Dias, Paulo Mateus Mendes, "3D Electrode Localization on Wireless Sensor Networks for Wearable BCI", IEEE EMBC08, 30th International Conference of the IEEE EMBS, Vancouver, Canada, August 20-24, 2008.
- P. Martins, V. F. Cardoso, J. Serrado Nunes, L. F. Rebouta, J. G. Rocha, G. Minas, S. Lanceros-Méndez "A Lab-on-a-Chip for Clinical Analysis with Acoustic Microagitation based on Piezoelectric Poly(vinylidene fluoride)", MRS2008 - Materials Research Society: Fall Meeting, Boston, MA, USA, 1-5 December 2008.
- V.F. Cardoso, P. Martins, J. Serrado Nunes, L. Rebouta, J. G. Rocha, S. Lanceros-Mendez, G. Minas, "Lab-on-a-chip with beta-PVDF based acoustic microagitation", The 22nd International Conference Eurosensors 2008, Dresden, Germany, 07-10 September 2008.
- C. M. Lima, D. Barbosa, J. Ramos, "Wireless Capsule Endoscopic frame Classification Scheme Based on Higher Order Statistics of Multi-scale Texture Descriptors", The 4th European Congress for Medical and Biomedical Engineering, Antwerp, Belgium, 23-27 November 2008.
- J. G. Rocha, R. Dias, L. M. Goncalves, "X-Ray CMOS Detector Array", IEEE Sensors 2008, Lecce, Italy, 26-29 October 2008.
- L. M. Gonçalves, "Deposition of Silicon Nitride Thin Films by Hot-Wire CVD at 100°C and 250°C", 5th HWCVD, Cambridge, EUA, 20-24 August 2008.
- M. Schäfer, C.P. Figueiredo, S. Kiefer, P. M. Mendes, R. Ruff, K.-P. Hoffmann, "Electrode Localization in a Self-organizing Network for Electrophysiological Diagnostics", Proc. 4th European Medical and Biological Engineering Conference EMBEC'08, pp. 2388-239, Antwerp, Belgium, 23-27 November 2008.
- C. P. Figueiredo, N. S. Dias, P.M. Mendes, "3D Electrode Localization on Wireless Sensor Networks for Wearable BCI," Proc. IEEE EMBC'08, 30th Annual International Conference of the IEEE Engineering in Medicine and Biology Society, pp. 2365 - 2368, August 20-24, 2008.
- Book chapters:
- G. M. Minas, "Lab-on-a-chip devices for chemical analysis. In Encyclopedia of Microfluidics and Nanofluidics". Dongqing Li (Ed.), Springer US, ISBN: 978-0-387-32468-5, Part 12, p. 910-927, September 2008.

Group Productivity

Ó. Gama, P. Carvalho, J. A. Afonso, P. M. Mendes, "Quality of Service in Wireless e-Emergency: Main Issues and a Case-Study", Book Series Advances in Soft Computing, Publisher Springer Berlin / Heidelberg, ISSN 1615-3871, September 2008.

Master and Ph.D. thesis completed

PhD thesis

Luis Miguel Valente Gonçalves, "Microsistema termoeléctrico baseado em teluretos de bismuto e antimónio". Started in March 2003. Finished on 22 July 2008.

Master thesis

1. Mestrado Integrado em Engenharia Biomédica, "Durabilidade de ampolas de raios-X em tomografia computadorizada", Orientando: José Luis Lopes Araujo, Orientadores: José Higinio Gomes Correia, Outubro de 2007 a 28 de Julho de 2008.
2. Mestrado Integrado em Engenharia Electrónica Industrial e Computadores, "Sensores ópticos para medição da frequência cardíaca e frequência respiratória". Orientando: Pedro Filipe Casanova Morim, Orientadores: José Higinio Gomes Correia, Outubro de 2006 a 31 de Julho de 2008.
3. Mestrado Integrado em Engenharia Electrónica Industrial e Computadores, "Parametrização e meshing automático em CAD baseado em elementos finitos". Orientando: Carlos Manuel Mota Marques, Orientadores: José Higinio Gomes Correia, Outubro de 2006 a 31 de Julho de 2008.
4. Mestrado Integrado em Engenharia Electrónica Industrial e Computadores, "Simulação dinâmica do encapsulamento de microchips ". Orientando: Rui Pedro Leitão da Silva da Rocha, Orientadores: José Higinio Gomes Correia, Outubro de 2007 a 22 de Outubro de 2008.
5. Mestrado Integrado em Engenharia Biomédica, "Tomografia computadorizada e densitometria óssea em casos de osteoporose", Orientando: Clarisse Marta de Oliveira Ribeiro, Orientadores: José Higinio Gomes Correia, Outubro de 2007 a 27 de Outubro de 2008.
6. Mestrado Integrado em Engenharia Biomédica, "Caracterização da impedância de microeléctrodos neuronais", Orientando: Ana Sofia Matos Silva, Orientadores: José Higinio Gomes Correia, Outubro de 2007 a 7 de Novembro de 2008.
7. Mestrado Integrado em Engenharia Biomédica, "Optimização de Processos de Prestadores de Cuidados de Saúde", Orientando: Eurico Martins, Orientadores: Graça Maria Henriques Minas, Outubro de 2006 a 18 de Novembro de 2008.
8. Mestrado Integrado em Engenharia Biomédica, "Sistema de aquisição de sinais neuronais sem fios", Orientando: José Fernando Pinto Ferreira, Orientadores: José Higinio Gomes Correia, Outubro de 2006 a 19 de Dezembro de 2008.
9. Mestrado Integrado em Engenharia Electrónica Industrial e Computadores, "Filtros ópticos fabricados através de tecnologia de pulverização catódica em magnetron para detector", Orientando: Ricardo Lameiro, Orientadores: Graça Maria H. Minas, 1 de Novembro de 2007 a 24 de Julho de 2008.
10. Mestrado Integrado em Engenharia Electrónica Industrial e Computadores, "Fotodetectores e respectivo sistema para detecção, leitura e processamento de dados de uma matriz de", Orientando: Helder Cunha, Orientadores: Graça Maria H. Minas, 1 de Novembro de 2007 a 15 de Dezembro de 2008.
11. Mestrado Integrado em Eng. Biomédica, "Microagitação acústica de fluidos baseada em polímeros electroactivos", Orientando: Vanessa Cardoso, Orientadores: Graça Maria H. Minas, Senentxu Lanceros-Mendez, 1 de Dezembro de 2007 a 23 de Julho de 2008.

Patents/propotypes

1. Patente Brasileira nr. BRPI0513018 e Patente nos Estados Unidos da América US2007298514, Microlaboratory for biological fluids analysis using white light, 22 de Abril de 2008. By G. Minas, J. C. Ribeiro, J. H. Correia.
2. Patente Europeia nr: WO2007000749 e Patente nos Estados Unidos da América US2008158069 , Integrated tunable microantenna with small electrical dimensions and manufacturing method thereof, 3 de Julho de 2008. By P. M. Mendes, J. H. Correia
3. Patente Europeia nr: WO2008018810, Body kinetics monitoring system, 14 de Fevereiro de 2008. By J. A. Afonso, H. R. Silva, L. A. Rocha, J. H. Correia.

PT103565: Sensor de fluxo baseado em polímero piezoeléctrico – por J. G. Rocha, G. Minas, V. Sencadas e S. Lanceros-Mendez (Departamento de Electrónica Industrial e Departamento de Física da Universidade do Minho), publicada no Boletim de Propriedade Industrial em 31-03-2008.

WO2008035297A2: Flow sensor based on a piezoelectric polymer – por J. G. Rocha, G. Minas, V. Sencadas e S. Lanceros-Mendez (Departamento de Electrónica Industrial e Departamento de Física da Universidade do Minho), 27 March 2008.

Industry contract research

Project iMLT, contract with ISA-Remote Management Systems, PI: Paulo Mateus Mendes, 91 268,00 €, from 1st November 2007, the goal is the development of a sensor of magnetic field for non-invasive measurement and remote transmission of the gas reservoirs level.

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.

Celso Figueiredo started his PhD work in collaboration with Fraunhofer IBMT Institute, at St. Ingbert, Germany.

Therefore, the goals for the next years is the development of nanodevices, especially related with CarbonNanoTubes (CNT) for neural

Group Productivity

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.

Mariana S. Fernandes started his collaboration with RLE Lab. at MIT/USA, to perform the work related to her PhD degree.

Future Research

Objectives

The future research of the group Micro/Nano technologies for Biomedical Applications will focus in:

- thermoelectric thin-films with high figure of merit obtained by thermal co-evaporation for fabricating integrated thermoelectrics microsystems
- Micro-Antennas for wireless biomedical devices.
- Development of integrated systems for car smart interiors.
- Microsytems for proteins analyzers.
- Endoscope capsules for navigation in the gastrointestinal tract.

Funding, source, dates

-FCT/PTDC/EEA-TEL/65286/2006, MEMS: Micro-Antenna for Wireless Biomedical Devices, 2009 2011, 130.000,00 €, P. M. Mendes.

-MIT-Pt/EDAM-SI/0025/2008, Development of integrated systems for smart interiors, 2009-2011, 60.000,00 €, J.H. Correia.

-FCT/PTDC/EEA-ENE/66855/2006, Thermoelectric energy scavenging microsystem, 2007 2010, 120.000,00 €, J. H. Correia.

- MAP- MicroAnalizador de Proteínas, ADI/QREN/2008, 161.885,92 €, consórcio: Instituto Agilus, IPO-Porto, Emilio Azevedo de Campos, UM, 2009-2011, G. Minas, Jorge Cabral, L. Gonçalves, J. H. Correia.

- NFCE- New functions for endoscope capsule, ADI/QREN/2008, 700.000,00 €, consórcio: Instituto Agilus, IPO-Porto, Emilio Azevedo de Campos, UM, 2009-2012, J. H. Correia, G. Minas, Carlos Lima, P. Mendes, L. Gonçalves, pending.