MAP-I
Programa Doutoral em Informática

Research Topics in Software Engineering

Unidade Curricular em Paradigmas da Computação
Paradigms of Computation
(UCPC)

UMinho, UAveiro, UPorto

May 8, 2010

Abstract

This document describes a Ph.D. level course, corresponding to a Curriculum Unit credited with 5 ECTS. It corresponds to a joint UMinho-UAveiro-UPorto proposal for UCPC (Paradigms of Computation) in the joint MAP-i doctoral program in Informatics.

LECTURING TEAM

UMinho:	Ricardo J. Machado, João Miguel Fernandes
UAveiro:	José Maria Fernandes
UPorto:	José Paulo Leal
Coordinator:	Ricardo J. Machado

A. Programmatic Component

1. Theme, Justification and Context

Motivation: Software Engineering

Software engineering is the application of a systematic, disciplined, quantifiable approach to the development, operation, and maintenance of software, and the study of these approaches; that is, the application of engineering to software. It applies both computer science and engineering principles and practices to the creation, operation, and maintenance of software systems. A knowledge of programming is the main prerequisite to becoming a software engineer, but it is not sufficient. In fact, software engineering, as a scientific field, encompasses many subdisciplines:

1. Software requirements: The elicitation, analysis, specification, and validation of requirements for software.
2. Software design: The process of problem-solving and planning for a software solution. After the purpose and specifications of software are determined, software developers plan for a solution. It includes low-level component and algorithm implementation issues as well as the architectural view.
3. Software development: The construction of software through the use of programming languages.
4. Software testing: The empirical investigations conducted to provide stakeholders with information about the quality of the product or service under test, with respect to the context in which it is intended to operate.
5. Software maintenance: Software systems often have problems and need enhancements for a long time after they are first completed. This subfield deals with those problems.
6. Software configuration management: Since software systems are very complex, their configuration (such as versioning and source control) have to be managed in a standardized and structured method.
7. Software engineering management: The management of software systems borrows heavily from project management, but there are nuances encountered in software not seen in other management disciplines.
8. Software development process: The process of building software is debated among practitioners with the main paradigms being agile or waterfall.

9. Software engineering tools: The scientific application of a set of tools and methods to a software which is meant to result in high-quality, defect-free, and maintainable software products.

10. Software quality: The approaches used to measure how well software is designed (quality of design), and how well the software conforms to that design (quality of conformance)

Software engineering is also related to the disciplines of computer science, project management, and systems engineering. This diversity of skills and competences makes it mandatory to have a broad approach when teaching software engineering. This course addresses some of the challenges faced by software engineers and the software engineering field that are posed by the increasing complexity of software intensive systems (and of their development) on which our society is increasingly dependent. More specifically, in this course, we plan to tackle several subdisciplines of software engineering and address the research challenges that nowadays emerge in those subdisciplines. Additionally, we plan to present in this course the state-of-the-art of several subdisciplines of software engineering and to identify challenges that might help doctoral students on selecting a topic for developing research in Software Engineering.

Course Context

ACM Computing Classification System subjects covered:

- D. Software / D.2 Software Engineering / D.2.1 Requirements/Specifications
- D. Software / D.2 Software Engineering / D.2.2 Design Tools and Techniques
- D. Software / D.2 Software Engineering / D.2.11 Software Architectures
- D. Software Engineering / Reusable Software / D.2.13 Domain engineering
- D. Software Engineering / Reusable Software / D.2.13 Reuse models
- K. Computing Milieux / K.6 Software Management / K.6.3 Software development

2. Objectives and Learning Outcomes

This course aims to introduce the fundamental concepts underlying the fields of architecture, design, construction and integration of large-software systems. More specifically it intends to cover, both from the foundational and the methodological point of

view, the construction, analysis, design, classification, animation, validation and verification of software systems at different levels of abstraction and concern. As a second objective the course aims at providing the conceptual tools for the use of models in all phases of the software process, with a particular emphasis on requirements and design. The course is not intended as an introductory survey to Software Engineering, but as an opportunity of exposing students to cutting-edge research topics in this area, although presented in a coherent and integrated way. It is placed at a similar level and cover overlapping material with advanced modules in doctoral programs at leading academic institutions.

Upon successful completion of this curricular unit, students should be able:

- to define what type of procedures the requirements engineering team is supposed to execute at the development process, by identifying the formal involvement of the stakeholders;
- to define the way requirements are to be elicited and the techniques to use to correctly gather requirements from all the sources;
- to promote the assessment of software process and to monitor, in collaboration with software engineers, the software process improvement efforts;
- to identify the positive and negative aspects of the software process, through the acquisition, analysis, and interpretation of quantitative data;
- to explain the need for describing software systems with models, as a way to abstract from the system's complexity and to reason about its properties;
- to use models for the activities (analysis, design, implementation, testing, maintenance) associated with the development of large software systems;
- to idealize different alternative architectures to solve the same problem and evaluate (justifying) which is the best one in terms of design quality;
- to recognize and understand several architectural and design patterns.

3. Course Contents

1. **REQUIREMENTS ENGINEERING & MANAGEMENT**
   This unit focuses on the software requirements knowledge area as a critical domain of software engineering, as outlined in the IEEE Computer Society's Software Engineering Body of Knowledge (SWEBOK). The area of software requirements deals with the acquisition, analysis, specification, validation, and maintenance of software requirements. Requirements are the properties that a given system (still in project) will exhibit when its development is finished. This area is

recognized as being extremely important for industry, since its activities have a great impact on the development process. This unit focuses on the following topics:

- Definition of requirement;
- Distinction among different types of requirements (user requirements vs. system requirements; functional requirements vs. non-functional requirements);
- Requirements process and its associated activities;
- Elicitation techniques;
- Requirements prioritization and negotiation.

2. **SOFTWARE PROCESS ENGINEERING**
The software engineering process can be considered at two distinct levels: (1) the activities related to the acquisition, development, and maintenance of software; (2) the activities related to the definition, implementation, measurement, and improvement the software process itself. In this context, this unit focuses on the techniques and methods devoted to: (1) the definition of software processes at its relation to the software artifacts' lifecycles; (2) the configuration of best practices of software referential design processes to support the development of large-scale software solutions. The unit is structured into the following topics:

- Software process fundamentals (software lifecycles and notations for process definition).
- Software processes for large enterprises (RUP, EUP, EABOK, TOGAF).
- Software improvement and maturity models (ISO standards, SEI reference models).

3. **MODEL-DRIVEN APPROACHES**
This unit's purpose is to study several modeling frameworks in Software Engineering, with a particular focus in approaches based on the Unified Model Language (UML). As the OMG specification states, UML is "a graphical language for visualizing, specifying, constructing, and documenting the artifacts of a software-intensive system". Although in itself it does not specify any methodological or design process, its role as a (collection of inter-related) semi-formal notations in supporting software development, from business processes or global architectures down to database schema, and reusable software components, became more and more fundamental, almost a de facto standard, to the whole Software Engineering discipline. This course unit also covers the fundamental issue of model transformation within the two basic types of models considered: visual (like UML) and formal (like VDM, Petri nets or ASM). Particular emphasis will be placed on the following topics:

- Making UML models precise and executable, either through the use of UML related languages (OCL and UML action semantics), or through the integration with formal specification languages (like VDM++, Spec#, ASM, Petri nets or Alloy).
- Definition of domain specific languages and UML profiles, using the UML extensibility mechanisms and the UML meta-model.
- Model analysis (with model-checking), simulation and testing.
- Model refinement and transformation (from analysis into design models, making explicit the envisaged software architecture, and from platform independent into platform specific models).
- Code generation from design models, especially for behavior-intensive systems, and its current limitations.
- Model-based testing (i.e., automatic generation of conformance test cases from models), especially for interactive systems, and its current limitations.
- Adaptation of high-maturity processes (like the Personal Software Process and Team Software Process) for model-driven software engineering.

4. **SOFTWARE DESIGN AND PATTERNS**
The architecture of a software system describes the global structure in terms of its components, external properties and its interrelations. As software systems grow in scale and complexity, it becomes increasingly more important to understand them at many abstraction levels other than algorithms, functions, objects or components, and by different kinds of people, such as procurers, acquirers, producers, integrators, trainers, and users. Architectural models for such large-scale systems must be tailored to allow the dynamic construction and allocation of customized applications to heterogeneous computing devices, with different computational or interface capabilities. In this unit, many design and architectural challenges for highly complex and large-scale software systems are addressed. Many of these are software engineering challenges that must take into consideration aspects not only related with individual computing devices, but also with the entire system obtained from the cooperation of diverse, dispersed, integrated or mobile computing devices that in conjunction contribute to the achievement of the overall system objectives. In particular, the following topics will be considered:

- Software design: fundamental concepts and principles.
- Software architecture: definitions, concepts, components, connectors, views, quality attributes.
- architectural styles, reference models and reference architectures.
- Architectural styles: pipes and filters, data abstraction, object-orientation, event-based systems, layered systems, repositories, interpreters, process-control systems.

- Software patterns: origins, notion of patterns and pattern languages, kinds of patterns (architectural, design, others).
- Thematic catalogs of patterns: patterns of enterprise application architecture, patterns for enterprise integration.

4. Teaching Methods and Student Assessment

The best way to understand and master software design and software architecture is to experience it. In the educational setting, this means:

- learning the fundamental concepts and principles;
- knowing and understanding the solutions and practices proven to be the best, through the exploration of specific examples from the past, so-called case studies; and
- applying the knowledge acquired by imitating and adapting known solutions to a specific problem through hands-on development of a software system, in an individual project.

No textbook adequately covers the course's range of topics, so a diversity of bibliographic elements (books, journals and conference proceedings) will be used.

Readings

All reading assignments come from journals and conference proceedings. Each week, the students must read papers or some few supplemental readings provided. This exposes many students to extensive readings from the research literature for the first time. To help them with their reading, we require them to write a brief summary for each paper, submitted via email at the beginning of the week. We also ask them to submit a list of questions about the readings, which we try to work into the lecture if possible. During the last few weeks of the course, we no longer require reading summaries, to give students more time to focus on the project.

Classes

The class meetings are meant to be conversational, and we encourage students to ask questions and make comments. Consequently, the discussion may follow tangents to the prepared lecture, but they should be fruitful, informative, and thought provoking. These classes are conducted by the 4 elements of the lecturing team.

Talks and Panels

Two talks (or panels) will be organized to complement the topics covered by the formal classes. These talks (or panels) will involve both the lecturing team and faculty members that are not formally associated with this UC.

Individual research project

For the individual research project, we base the grade on an oral presentation (for a more methodological project) or a demonstration (for a more technological project), and a final written report. A few weeks into the course, we hand out descriptions of possible projects. The students have a week to look over the project descriptions before choosing one of them. No two students can work on the same project. We make the project descriptions intentionally vague, since it gives them considerable leeway in making design decisions. Having too specific descriptions would force students down a design path that they might not choose on their own. Once students complete their project, they must demonstrate it, make an oral presentation, and submit a final written report. The report has two major pieces: first, the discussion of the project major design decisions and trade-offs; second, one section entitled "If I could do it all over again. . ." describing what they would do differently if they could have a second chance to start from the beginning.

5. Basic Bibliographic References

- Ambler SW, Nalbone J, Vizdos MJ. *The Enterprise Unified Process: Extending the Rational Unified Process*, Addison-Wesley, 2008.
- Buschmann F, Meunier R, Rohnert H, Sommerlad P, Stal P. *Pattern-Oriented Software Architecture, Volume 1: A System of Patterns*, John Wiley & Sons, 1996.
- Gamma E, Helm R, Johnson R, Vlissides J. *Design Patterns - Elements of Reusable Object-Oriented Software*, Addison-Wesley, 1995.
- Gomaa H. *Designing Software Product Lines with UML: From Use Cases to Pattern-Based Software Architectures*, Addison-Wesley, 2005.
- Kleppe A, Warmer J, Bast W. *MDA Explained: The Model Driven Architecture – Practice and Promise*, Addison-Wesley, 2003.
- Mellor SJ, Balcer MJ. *Executable UML: A Foundation for Model-Driven Architecture*, Addison-Wesley, 2002.

- Robertson S, Robertson J. *Mastering the Requirements Process*, Addison Wesley, 2nd edition, 2006.
- Shaw M, Garlan D. *Software Architecture: Perspectives on an Emerging Discipline*, Prentice Hall, 1996.
- Utting M, Legeard M. *Practical Model-Based Testing: A Tools Approach*, Morgan Kaufmann, 2007.

B. Lecturing Team

1. Team Presentation

This course is supported by a team involving researchers from the University of Minho (Ricardo J. Machado, João M. Fernandes), the University of Aveiro (José Maria Fernandes), and the University of Porto (José Paulo Leal). This course is the result of merging two former MAPi units: MDSE (Model-Driven Software Engineering) and ADLSSS (Architecture and Design of Large-Scale Software Systems). MDSE and ADLSSS have successfully been accredited as CMU courses, within the Carnegie Mellon — Portugal Program. Similarly, the current team is available to submit the RTSE course to the same accreditation process.

All team members are working, and have worked actively in the past few years, on topics that are directly related to the subjects covered by this course, as detailed below.

2. Coordinator

The coordinator of the unit is Ricardo J. Machado.

3. Short Presentation of Team Members

In the sequel we introduce a brief presentation of each team member, which includes, for each of them, up to 5 key publications related to the scientific area in which this course is proposed. **All CVs are supplied in separate PDF documents**.

Ricardo J. Machado is an Assistant Professor at the Department of Information Systems, UMinho. He is the coordinator of the UMinho scientific activities within the CMU-Portugal Program. His research focuses on software engineering & management, namely on model-driven development, requirements engineering, and software quality. He has lead several research projects resulting in more than 60 publications. His current research projects focus on the development of multi-staged approaches in software product lines and on the integration of multi-standard models in software high maturity levels. He leads the SEMAG research group at the Algoritmi Research Center. He has been involved in the organization of various international events, including ACSD 2003, DIPES 2006, QUATIC 2007, IEEEXtreme 2008 and the MOMPES workshops series.

Key Publications:

- Ferreira A, Machado RJ, Paulk M; Size and Complexity Attributes for Multi-model

Improvement Framework Taxonomy. 36th EUROMICRO Conference on Software Engineering and Advanced Applications (SEAA 2010), Lille, France, IEEE Computer Society Press, Sep/2010.

- Monteiro P, Machado RJ, Kazman R, Henriques C; Dependency Analysis between CMMI Process Areas. 11th International Conference on Product Focused Software Development and Process Improvement (PROFES 2010), Limerick, Ireland, Springer, Jun/2010.

- Bragança A, Machado RJ; A Model Driven Approach for the Derivation of Architectural Requirements of Software Product Lines, Innovations in Systems and Software Engineering 5(1):65–78, Springer, Mar/2009.

- Bragança A, Machado RJ; Transformation Patterns for Multi-staged Model Driven Software Development. 12th International Software Product Line Conference (SPLC 2008), Limerick, Ireland, IEEE Computer Society Press pp. 329–338, Sep/2008.

- Machado RJ, Lassen KB, Oliveira S, Couto M, Pinto P; Requirements Validation: Execution of UML Models with CPN Tools. International Journal on Software Tools for Technology Transfer 9(3–4):353–370, Springer, Jun/2007.

João M. Fernandes is associate professor at the Department of Informatics, UMinho, and a researcher member of CCTC. His scientific research activities are centered around the areas of requirements engineering for software systems, with a particular focus in embedded systems. His interests lie on the usage of the UML and high-level Petri nets, as specification notations for highly complex software systems, and in studying and applying model-driven development approaches. In the embedded software area, his attention focus on issues related to the methodological approach to follow, namely the requirements techniques, the software process model, and the models to be used during development. He is a co-founder and regular editor for the International Workshop Series on Model-based Methodologies for Pervasive and Embedded Software (MOMPES). He is a funding member of the IFIP Working Group 10.2 (Embedded Systems). He is Program Co-chair of the 3rd International Summer School on Generative and Transformational Techniques in Software Engineering (GTTSE 2009), to be held in Jul/2009. In 2002/03, he was a postdoctoral researcher at TUCS (Turku, Finland), and in 2006/7 he was an invited assistant professor at University of Aarhus (Denmark).

Key Publications:

- Gomes L, Fernandes JM (eds.); *Behavioral Modeling for Embedded Systems and Technologies: Applications for Design and Implementation*, IGI Global, ISBN 1-60566-750-1, Jul/2009.

- Jørgensen JB, Tjell S, Fernandes JM; Formal Requirements Modeling with Executable Use Cases and Coloured Petri Nets, Innovations in Systems and Software Engineering 5(1):13–25, Springer, Mar/2009.

- Fernandes JM, Machado RJ, Seidman S; A Requirements Engineering and Management Training Course for Software Development Professionals, 22th IEEE-CS Conference on Software Engineering Education & Training (CSEE&T 2009), Hyderabad, Índia, IEEE Computer Society Press, pp. 20–5, Fev/2009.
- Fernandes JM, Jørgensen JB, Tjell S; Requirements Engineering for Reactive Systems: Coloured Petri Nets for an Elevator Controller, 14th Asia-Pacific Software Engineering Conference (APSEC 2007), Nagoya, Japan, IEEE Computer Society Press, pp. 294–301, Dec/2007.
- Machado RJ, Ramos I, Fernandes JM; Specification of Requirements Models, Engineering and Managing Software Requirements, Aurum A., Wohlin C. (eds.), chap. 3, pp. 47–68, Springer, Jul/2005.

José Maria Amaral Fernandes is assistant professor at the Dep. of Electronics, Telecommunications and Informatics of the Universidade de Aveiro (UA). For the last 5 years, he has being lecturing in software architecture and engineering areas with focus on modelling system (UML, architecture & design patterns) within a agile processes (e.g. OpenUP) to support team work in the development of IT systems using enterprise level solutions (J2EE, Hudson, SVN). Since 2009, his interests turned into mobile systems namely from a design patterns perspective. This new interest resulted recently in collaboration with Prof. David Garlan (School of Computer Science, Carnegie Mellon University) under the faculty exchange program in the context of the Carnegie Mellon-Portugal initiative. Since 1997, he is a member of the "Healthcare Information and systems" R&D group of IEETA ? an R&D institute of the UA - (http://www.ieeta.pt/sias) where he has been part of more than 10 projects centred in the area biosignal and medical multimedia data processing with special emphasis on brain imaging (EpilBI, MovEpil, FCT) and more recently in Grid computing (BING and GeresMED, FCT). He is part of the core team of the BING project of the Brain Imaging Network (a consortium of Aveiro, Coimbra, Minho and Porto Universities ? http://www.brainimaging.pt) and is involved in the conception and deployment of IT infrastructure and information system. Recently, he is a member of the Vital-Responder project (http://www.vitalresponder.org from Carnegie Mellon-Portugal program) responsible for the IT framework for incorporating the vital signs acquisition and monitoring in mobile devices within the Vital-Responder running framework.

Key Publications:

- Cunha JPS, Tafula S, Fernandes JM; 3D video-fMRI: Tri-dimensional video-based movement quantification in a 3T fMRI environment, accepted in Human Brain Mapping, Barcelona, Spain, 2010.
- Oliveira IC, Alves L, Dias E, Pacheco D, Lima S, Barros J, Monteiro MP, Silva JA, Fernandes JM, Cunha JPS, Sousa Pereira A; Automated endoscopic capsule analysis using a Grid computing environment, accepted in IBERGRID 2010, Braga, Portugal, May/2010.

- Oliveira I, Cunha JPS, Pacheco D, Fernandes JM, Pedrosa M, Alves L, Sousa Pereira A; The Portuguese BING Network: Towards a Brain Imaging Grid Virtual Community, MICCAI-Grid, London, UK, 2009.
- Fernandes JM, Tafula S, Brandão S, Bastos Leite A, Ramos I, Cunha JPS; Video-EEG-fMRI: Contribution of in-bore Video for the Analysis of Motor Activation Paradigms, World Congress on Medical Physics and Biomedical Engineering, Munich, Germany, Springer, pp. 786–9, Sep/2009.
- Pacheco D, Oliveira I, Fernandes JM, Cunha JPS; MAGI: A medical application Grid interfacing portal for eScience, 3rd Iberian Grid Infrastructure Conference (IBERGRID 2009), Valencia, Spain, NetBiblo, pp. 31–42, May/2009.

José Paulo Leal is assistant professor at the Department of Computer Science (DCC), Faculty of Sciences of the University of Porto FCUP, and a research member of CRACS. His main scientific interest are e-learning system development and semi-structured language (XML) processing; software engineering is a relevant topic in both cases. He has been involved in several research projects that resulted in systems currently in operation, including technology transfer projects with industrial partners. He is currently responsible for a course on software architecture integrated in MIERSI (Mestado Integrado em Redes e Sistemas Informáticos) and was responsible for the courses on the software Engineering in the pre-Bolonha programs offered by DCC.

Key Publications:

- Leal JP, Queirós R; CrimsonHex: a Service Oriented Repository of Specialised Learning Objects, 11th International Conference on Enterprise Information Systems (ICEIS 2009), Milan, Italy, May/2009.
- Leal JP, Queirós R; Integration of E-Learning Systems with Repositories of Learning Objects, 7th European Conference on e-Learning, Agia Napa, Cyprus, Nov/2008.
- Leal JP, Silva P; An extensible architecture for web adaptability, Web and Text Intelligence 08, Salvador, Bahia, Brazil, Oct/2008.
- Leal JP, Domingues MA; Rapid Development of Web Interfaces to Heterogeneous Systems, 33rd International Conference on Current Trends in Theory and Practice of Computer Science (SOFSEM 2007), Harrachov, Czech Republic, Springer, pp. 716–725, Jan/2007.
- Leal JP, Silva F; Mooshak: a Web-based multi-site programming contest system Software?Practice & Experience, 33(6):567–581, May/2003.
- Tomás AP, Leal JP; A CLP-Based Tool for Computer Aided Generation and Solving of Maths Exercises. 5th International Symposium on Practical Aspects of Declarative Languages (PADL 2003), New Orleans, LA, USA, Springer, pp. 223–240, Jan/2003.

4. Short Presentation of Invited Speakers/Panelists

João Pascoal de Faria is assistant professor at the Department of Informatics Engineering of FEUP, and a researcher at INESC Porto. He conducts and supervises research work in the areas of model-based testing and model-driven development, based both on formal and semi-formal (UML) models, since 2003. He is the principal investigator of the research project "AMBER iTest - An automated model-based user interface testing environment" (2007-2010). He is the main author of a rapid application development (RAD) tool, based on domain specific languages, with 20 years of market presence and evolution (1989-2009). He has more than 10 years of experience in teaching, consultancy and research in several software engineering areas, namely software testing, requirements engineering and software project management. Since 2008, he is a Certified Personal Software Process (PSP) Developer, Authorized PSP Instructor, and Team Software Process (TSP) Coach by the Software Engineering Institute of the Carnegie Mellon University.

Key Publications:

- Paiva A, Faria JP, Vidal R, Tillmann N; Modeling and Testing Hierarchical GUIs, 12th International Workshop on Abstract State Machines (ASM 2005), Paris, France, pp. 329–344, Mar/2005.
- Paiva A, Faria JP, Vidal R, Tillmann N; A Model-to-implementation Mapping Tool for Automated Model-based GUI Testing, 7th International Conference on Formal Engineering Methods (ICFEM 2005), Manchester, UK, Springer, pp. 450–464, Nov/2005.
- Paiva A, Faria JP, Vidal R; Towards the Integration of Visual and Formal Models for GUI Testing, 3rd Workshop on Model Based Testing (MBT 2007) at ETAPS 2007, Braga, Portugal, Mar/2007.
- Paiva A, Faria JP, Mendes PM; Reverse Engineered Formal Models for GUI Testing, 12th International Workshop on Formal Methods for Industrial Critical Systems (FMICS 2007), Berlin, Germany, Jul/2007.
- Cruz AM, Faria JP; Automatic Generation of Interactive Prototypes for Domain Model Validation, 3rd International Conference on Software and Data Technologies (ICSOFT 2008), Porto, Portugal, Jul/2008

Ademar Aguiar is a Professor at Faculty of Engineering of University of Porto (FEUP) and conducts Research & Development at INESC Porto. He has over 20 years of experience on software development and has specialized on software design and architecture, namely application frameworks and software patterns, agile processes, and software documentation, topics about which he has authored research papers and presented

courses to academic and industrial audiences. He holds a PhD from FEUP addressing the topic of documenting object-oriented frameworks using an approach supported on wikis. Currently, his main research interests are on wiki-based tools to support agile software development and agile documentation of object-oriented frameworks.

Key Publications:

- Restivo A, Aguiar A; Towards Detecting and Solving Aspect Conflicts and Interferences Using Unit Tests, Software Engineering Properties of Languages and Aspect Technologies (SPLAT '07), Vancouver, B.C., Canada, Mar/2007.
- Aguiar A, David G; Patterns for Documenting Frameworks: part III, PLoP 2006, Portland, USA, Oct/2006.
- Flores N, Aguiar A; Design Pattern Recovery to Improve Framework Understanding, 1st International Workshop on Design Patterns Detection for Reverse Engineering (DPD4RE 2006) at WCRE 06, Benevento, Italy, Oct/2006.
- Silveira C, Faria JP, Aguiar A, Vidal R; Wiki Based Requirements Documentation of Generic Software Products, 10th Australian Workshop on Requirements Engineering (AWRE 2005), Melbourne, Australia, pp. 42–51, Nov/2005. (best paper award)
- Aguiar A, David G; WikiWiki Weaving Heterogeneous Software Artifacts, International Symposium on Wikis (WikiSym 2005), at ACM OOPSLA 2005, San Diego, California, USA, Oct 17-18, 2005.

Curriculum Vitae

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2010, 07 May

- short version -

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Academic degrees, Institutions, Fields of study:

- PhD, UMinho, Informatics and Computer Engineering, 1997-2001.
- MSc, UMinho, Informatics and Computer Engineering, 1994-1996.
- DEng, UPorto, Electronics and Computer Engineering, 1989-1994.

Current position, Institution: Assistant Professor, U.Minho, since Apr/2001.

Previous positions, Institutions:

- Faculty member, UMinho, since 1996.
- R&D Engineer, Texas Instruments Portugal, 1994-1996.
- Junior Researcher, ENSEA Paris - Ecole Nationale Superieur de l'Electronique et de ses Applications, 1994.
- Junior Researcher, INESC Porto - Instituto de Engenharia de Sistemas e Computadores, 1993-1994.

Main research area: Software Engineering & Management

Other scientific interests: Embedded Software, Industrial Information Systems

Most relevant publications (2006-10):

- Sofia Azevedo, Ricardo J. Machado, Alexandre Braganca, Hugo Ribeiro, Dirk Muthig. Systematic Use of Software Development Patterns through a Multilevel and Multistage Classification. Janis Osis, Erika Asnina (Eds.), Model Driven Domain Analysis and Software Development: Architectures and Functions, IGI Global, Hershey, U.S.A. [to appear].
- Ricardo J. Machado, João M. Fernandes, João P. Barros, Luís Gomes. Scenario-based Modeling in Industrial Information Systems. Proceedings of the 18th IFIP World Computer Congress - IFIP WCC 2010, 7th IFIP Working Conference on Distributed and Parallel Embedded Systems – DIPES 2010, Brisbane, Australia, September, 2010, IFIP Series, Springer-Verlag, New York, U.S.A., September, 2010, [to appear].
- Sofia Azevedo, Ricardo J. Machado, Alexandre Bragança, Hugo Ribeiro. The UML «extend» Relationship as Support for Variability in Use Case Modeling with Refinement. Proceedings of the 14th International Software Product Line Conference - SPLC 2010, Jeju Island, South Korea, September, 2010, LNCS Series, Springer-Verlag, Berlin Heidelberg, Germany, [to appear].
- André Ferreira, Ricardo J. Machado, Mark Paulk. Size and Complexity Attributes for Multi-model Software Process Improvement Framework Taxonomy. Proceedings of the 36th EUROMICRO Conference on Software Engineering and Advanced Applications - SEAA 2010, Lille, France, September, 2010, IEEE Computer Society Press, Los Alamitos, California, U.S.A., [to appear].
- Sofia Azevedo, Ricardo J. Machado, Alexandre Bragança, Hugo Ribeiro. The UML «include» Relationship and the Functional Refinement of Use Cases. Proceedings of the 36th EUROMICRO Conference on Software Engineering and Advanced Applications - SEAA 2010, Lille, France, September, 2010, IEEE Computer Society Press, Los Alamitos, California, U.S.A., [to appear].
- Maribel Yasmina Santos, Ricardo J. Machado. On the Derivation of Class Diagrams from Refined Logical Software Architectures. Proceedings of the 5th International Conference on Software Engineering Advances - ICSEA 2010, Nice, France, August, 2010, IEEE Computer Society Press, Los Alamitos, California, U.S.A., [to appear].

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- Sofia Azevedo, Ricardo J. Machado, Dirk Muthig, Hugo Ribeiro. Refinement of Software Product Line Architectures through Recursive Modeling Techniques. Robert Meersman, Pilar Herrero, Tharam Dillon (Eds.), On the Move to Meaningful Internet Systems: OTM 2009 Workshops, pp. 411-422, LNCS Series vol. 5872, Springer-Verlag, Berlin Heidelberg, Germany, November, 2009, [ISBN-978-3-642-05289-7].
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- 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, Idea Group Publishing, Hershey, U.S.A., February, 2008, [ISBN-978-1-59904-840-6].
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Communications Technology - QUATIC'2007, Session of SEDES 2007 Workshop, Lisbon, Portugal, September, 2007, pp. 223-227, IEEE Computer Society Press, Los Alamitos, California, U.S.A., [ISBN-0-7695-2948-8].

- Alexandre Bragança, Ricardo J. Machado. Automating Mappings between Use Case Diagrams and Feature Models for Software Product Lines. Proceedings of the 11th International Software Product Line Conference – SPLC 2007, Session of Feature Modeling, Kyoto, Japan, September, 2007, pp. 3-12, IEEE Computer Society Press, Los Alamitos, California, U.S.A., [ISBN-0-7695-2888-0].
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PhD and MSc Supervision:

- PhD: Sofia Azevedo. Theme: Multi-stage Model Transformations in Software Factories.
- PhD: André Ferreira. Theme: Software Process Improvement Strategies: Six Sigma for CMMI Level 4.
- PhD: Paula Monteiro. Theme: Inception of Software Validation and Verification Practices within CMMI Level 2: An IEEE/ISO 29119 Roadmap.
- PhD: Nuno Ferreira. Theme: Multi staged Domain Specific Modeling for Software Product Lines: An Insurance Ontology Analysis.
- PhD: Francisco Duarte. Theme: Automated Information Systems Generation for Process Oriented Organizations.
- PhD: José Eduardo Fernandes. Theme: Software Development for Pervasive Information Systems: Orientation to Models.
- PhD: Alexandre Bragança. Theme: Methodological Approaches and Techniques for Model Driven Development of Software Product Lines (concluded: April 2008).
- MSc: João Fertuzinhos. Theme: Representação Dinâmica da Variabilidade de Componentes para Aplicações Informáticas.
- MSc: Paulo Lima. Theme: A Modelação de Processos de Negócio no Âmbito da Norma ISO 9000:2000 (concluded: December 2009).
- MSc: Sandra Brandão. Theme: Validaça o de Software Dedicado a Gesta o Documental (concluded: December 2009).
- MSc: Tiago Silva. Theme: Classificação dos Produtos de Software Baseada na Norma ISO/IEC 9126 Qualidade de Software (concluded: December 2009).
- MSc: Nuno Santos. Theme: Implementação de Processos de Negocio em Software Utilizando Transformações de Modelos (concluded: December 2009).
- MSc: Rosa Carvalho. Theme: A Utilização de Modelos Normativos e Processuais na Validação de Sistemas ERP (concluded: December 2009).

- MSc: Sofia Azevedo. Theme: UML Metamodelling and ERP Software Solutions: Experiments with Microsoft DSL Tools (concluded: September 2008).
- MSc: Pedro Borges. Configuração do RUP com Vista à Simplificação dos Elencos Processuais em PMEs de Desenvolvimento de Software (concluded: June 2008).
- MSc: José Luís Gomes. Theme: Processo de Implementação de ERPs: Um Método para o Ajuste de Requisitos e a Optimização de Funcionalidades (concluded: July 2007).
- MSc: Sérgio Oliveira. Theme: Colored Petri Nets in the Animation of UML Models for Requirements Validation (concluded: October 2006).
- MSc: Paula Monteiro. Model-based Transformations for Software Architectures: A Pervasive Application Case Study (concluded: May 2006).
- MSc: Nuno Silva. Theme: Rejuvenescimento de Aplicações: Uma Experiência com Software de Seguros (concluded: February 2006).
- MSc: Filipe Paiva. Geração Automática de Modelos de Simulação de uma Linha de Produção na Indústria Têxtil (concluded: July 2005).
- MSc: Luís Carlos Ferreira. Geração Automática de Modelos de Simulação de uma Linha de Produção na Indústria Electrónica (concluded: June 2003).

Scientific Responsibilities:
- Leader and principal researcher of SEMAG (Sofware Engineering and Management Group) of the University of Minho (since 2001).
- Coordinator of the University of Minho's scientific activities within the CMU-Portugal Program, by nomination of the University of Minho's Rector (since 2006).
- Deputy Coordinator of the University of Minho's participation in CEDT (*Centro de Excelência em Desmaterialização de Transações*), by nomination of the University of Minho's Rector (since 2007).
- Member of the Project Control Committee of CCG (*Centro de Computação Gráfica*) within the INI-GraphicsNet, by nomination of the University of Minho's Rector (since 2006).
- Scientific coordinator of the following on-going financed research projects: STACOS: Standard based Cooperative Software (FCT/POSI/CHS/48875/2002), uPAIN: Ubiquitous Solutions for Pain Monitoring and Control in Post Surgery Patients (AdI/IDEIA/70/2004/3.1B/00364/007), SOFTAS: Software Development with Aspects (FCT/POSI/EIA/60189/2004; coordinator of T2).
- Founder and Chair of the Steering Committee of the international workshop series MOMPES (International Workshops on Model-Driven Methodologies for Pervasive and Embedded Software); the previous edition (the 6th) was held in cooperation with ICSE'09, in Vancouver, Canada.
- Regular scientific reviewer of several journals, such as: IEEE Transactions on Software Engineering (TSE), IEEE Transactions on Knowledge and Data Engineering (TKDE), LNCS Transactions on Petri Nets and Other Models of Concurrency (ToPNoC), Springer Journal of Computer Science and Technology (JCST), Elsevier Journal on Computer Standards & Interfaces (CS&I), Nordic Journal of Computing (NJC), IEEE Computer (COM), IEEE Software (SWE), IEEE Micro (Micro), IEEE Transactions on CAD (TCAD), IEEE Transactions on Industrial Electronics (TIE).

Activities in other Technical & Scientific Institutions:
- Coordinator of IEEE Computer Society Chapters and Student Chapters in Region 8 (Europe, Middle East and Africa) (2007-08).
- President of the Portuguese representation in the IFIP Technical Committee in Computer Systems Technology (TC10) (2006-09).
- President of CT128 (*Comissão Técnica de Normalização Sectorial em Engenharia de Software e de Sistemas de Informação*) within *Instituto de Informática (Ministério das Finanças*) (since 2005).
- Vice-President of CS03 (*Comissão Sectorial para as Tecnologias de Informação e Comunicações*) within *Instituto Português da Qualidade* (*Ministério da Economia*) (since 2008).
- Steering Committee Member of Informatics Engineering Society (North Region) of the Portuguese Engineering Association (since 2004).
- Scientific reviewer of projects submitted to the *Agência de Inovação* within *the Fundação para a Ciência e a Tecnologia* (since 2004).
- Founding member of IFIP WG10.5 SIG-ES (Special Interest Group on Embedded Systems) and IFIP WG10.2 Working Group on Embedded Systems.
- Founding member of IEEE-IES TCEDU (Technical Committee on Education in Engineering and Industrial Technologies) (since 2006).
- Member of IEEE-CS CAB (Chapters Activities Board) (2007-08).
- Member of IEEE-CS EAB (Educational Activities Board) (since 2007).

Volume Edition:

- Kenneth Boness, João M. Fernandes, Jon G. Hall, Ricardo J. Machado, Roy Oberhauser (Eds.). Proceedings of the 4th International Conference on Software Engineering Advances - ICSEA 2009, Porto, Portugal, September, 2009, IEEE Computer Society Press, Los Alamitos, California, U.S.A., [ISBN-978-0-7695-3777-1].
- João M. Fernandes, Ricardo J. Machado, Luís C. Lamb, Flávio R. Wagner (Eds.). Proceedings of the 6th International Workshop on Model Based Methodologies for Pervasive and Embedded Software - MOMPES'09, Vancouver, British Columbia, Canada, May, 2009, ICSE 2009 Companion Volume, IEEE Computer Society Press, Los Alamitos, California, U.S.A., [ISBN-978-1-4244-3495-4].
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- Johan Lilius, Ricardo J. Machado, Dragos Truscan, João M. Fernandes, Ivan Porres (Eds.). Nordic Journal of Computing (NJC), Special Section on Model Based Methodologies for Pervasive and Embedded Software, vol. 12, no. 3, Fall, 2005, Helsinki, Finland, [ISSN-1236-6064].
- Johan Lilius, Ricardo J. Machado, Dragos Truscan, João M. Fernandes (Eds.). Proceedings of the 2nd International Workshop on Model-Based Methodologies for Pervasive and Embedded Software - MOMPES'05, Rennes, France, June, 2004, TUCS General Publication no. 39, Turku, Finland, [ISBN-952-12-1556-9], [ISSN-1239-1905].
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- Johan Lilius, Felice Balarin, Ricardo J. Machado (Eds.). Proceedings of the 3rd IEEE/IFIP/ACM/FME International Conference on Application of Concurrency to System Design - ACSD'03, Guimarães, Portugal, June, 2003, IEEE Computer Society Press, Los Alamitos, California, U.S.A., [ISBN-0-7695-1887-1].

Patents:

- 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.
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- Ricardo J. Machado, André G. Cardoso. Die Bond Touch Down Detector (continuation of patent US05608172). Texas Instruments Incorporated, Dallas, Texas, U.S.A. U.S. Patent and Trademark Office, U.S.A. Filed: US01996000713375 in 13/Sep/1996. Issued: US05696329 in 09/Dec/1997.

Curriculum Vitae

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Academic degrees, fields of study, awarding institution, dates:
- PhD in Computer Science, University of Porto, 11/97
- BSc Applied Mathematics, University of Porto, 7/87

Current position, institution, starting date:
- Assistant Professor, University of Porto, since 11/97.
- Researcher at CRACS/UP since 2008.

Previous positions, institutions, dates:
- Assistant lecturer, University of Porto, 05/1989
- Junior lecturer, University of Porto, 10/1987
- Researcher at LIAC/UP from 1988 to 2008.

Management and/or coordination positions:
- Member of the departmental executive commission, from 01/2006 to 12/2008.
- Coordinator of the computer laboratories of the department, from 2002 to 2008.

Teaching experience:
Has been teaching courses at undergraduate and post-graduate level in Software Engineering, Users Interfaces, Structured Documents Processing, Web Applications Development at the University of Porto since 1987.

Main scientific area of research:
The research activities have mainly been realized within the Center for Research in Advanced Computing Systems (CRACS) of the University of Porto. This is a research unit associated with the INESC-Porto Associated Laboratory - Institute for Systems and Computer Engineering of Porto, classified as Excellent by the independent evaluation.
His main research has been in areas related with software engineering, more specifically in the development of web applications in general and web learning environments in particular, web services, and structured document (XML) processing.

Applied research experience:
For many years has been involved in projects with industry, specially in the development of web applications, including the development of first versions of the search engine Aeiou network of web sites (www.aeiou.pt) and the content management system still in use by most of the sites of this network.

Supervision of post-graduate students:
Has successfully supervised or co-supervised 12 MSc students. Currently supervises 2 PhD students (1 in co-supervision) 5 MSc students (2 in co-supervision).

Recent coordination and participation in externally funded research projects:

- Ganesh - A Modular and Distributed Environment for Learning Computer Science
  PRAXIS/P/EEI/14232/98 - Coordinator
- AGILMAT - Automatic Generation of Interactive Drills for Mathematics Learning
  POSI/CHS/48565/2002
- Site-O-Matic - Web Site Automation
  POSC/EIA/58367/2004
- EduJudge - Integrating On-line Judge into Effective E-learning
  135227-LLP-1-207-1-ES-KA3-KA3MP
- Palco 3.0 - An intelligent web system for managing a music related social network

Publications: Has published several papers in journals and international referred conferences. Some of the most recent publications are:

José Paulo Leal, Fernando Silva, "Mooshak: a Web-based multi-site programming contest system", Software: Practice and Experience, May 2003, vol. 33 n.6 (pp 567-581)

Ana Paula Tomá, José Paulo Leal, "A CLP-Based Tool for Computer Aided Generation and Solving of Math Exercises", in In V. Dahl, P. Wadler, Practical Aspects of Declarative Languages, 5th Int. Symposium PADL 2003, pp 223-240, Lecture Notes in Computer Science, Springer-Verlag

M.A. Alves, A. Jorge, J.P. Leal, "Extreme Adaptivity", Adaptive Hypermedia 2004 Conference, Lecture Notes in Computer Science, Springer-Verlag

José Paulo Leal, Marcos Aurélio Domingues, "Rapid development of web interfaces to heterogeneous systems", in Jan van Leeuwen et al, SOFSEM 2007: Current Trends in Theory and Practice of Computer, pp 716-725. Lecture Notes in Computer Science, Springer-Verlag

Ana Paula Tomás, José Paulo Leal, Marcos Aurélio Domingues, "A Web Application for Mathematics Education" in Howard Leung and Frederick Li and Rynson Lau and Qing Li (Eds.), ICWL 2007: Advances in Web Based Learning - ICWL 2007, August 2007, Edinburgh, United Kingdom

Marcos Aurélio Domingues and José Paulo Leal and Alípio M. Jorge and Carlos Soares and Pedro Machado "A platform to support web site adaptation & monitoring of its effects: a case study", in "6th Workshop on intelligent techniques for web personalization & recommender systems (ITWP 08), held in conjunction with AAAI'08, Chicago, USA", pp.2936, July 2008.
José Paulo Leal and Ricardo Quirós, "Integration of E-Learning Systems With Repositories of Learning Objects", 7th European Conference on e-Learning, Agia Napa, Cyprus, November 2008

José Paulo Leal and Ricardo Quirós, "CrimsonHex: a Service Oriented Repository of Specialised Learning Objects", in Joaquim Filipe and José Cordeiro (Eds.) Proceedings of ICEIS'09: 11th International Conference on Enterprise Information Systems, pages 102-113, Milan, Italy, May 2009, ISBN: 978-3-642-01346-1

José Paulo Leal and Jorge Bráz Gonalves "An Architecture for the Rapid Development of XML-based Web Applications", in "ICEIS 2009 - Proceedings of the 11th International Conference on Enterprise Information Systems, Milan, Italy", Springer-Verlag, LNBIP, vol. 24, pp.274-277, May 2009.

José Paulo Leal, Ricardo Queirós, "schem@Doc: a web-based XML schema visualizer", em Luís Rodrigues e Rui Lopes (Eds), Actas do Inforum - Simpósio de Informática, Lisbon, September 2009, pp 311-321, ISBN 978-972-9348-18-1

José Paulo Leal and Ricardo Queirós, "Defining Programming problems as Learning Objects", World Academy of Science, Engineering and Technology (58 2009), pp 1033-1040, ISSN: 2070-3724

José Paulo Leal, "Responding to Questionnaires on the web using XwQuest",in Pedro Isaías, Bebo White and Miguel Baptista Nunes (Eds.), Proceedings of the IADIS International Conference WWW/INTERNET, Rome, Italy, November 2009, pp 149-156, ISBN: 978-972-8924-93-5

José Paulo Leal and Ricardo Queirós "eLearning Frameworks: a survey", in "International Technology, Education and Development Conference, Valencia, Spain", March 2010.

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Curriculum Vitae

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Academic degrees, Institutions, Fields of study:

- PhD in Electrotecnical Engineering, University of Aveiro, Portugal, 2007
- MSc in Computer Science, Faculty of Science, University of Oporto, 1998.
- Graduated in Computer Science, Faculty of Science, University of Oporto, 1996.

Current position, Instituition:

- Assistant professor, Dept. of Electronics, Telecommunications and Informatics (DETI), University of Aveiro, since Oct/2008
- 1997 – present: Researcher at SIAS group (http://www.ieeta.pt/sias) at Instituto de Engenharia Electrónica e Telemática de Aveiro (IEETA) , University of Aveiro

Previous positions:

- March 2007 – September 2008: Assistant professor (invited), Dept. of Electronics, Telecommunications and Informatics (DETI), University of Aveiro
- February 2002- March 2007: Teaching Assistant, DETI, University of Aveiro
- 1999-2002: PhD student under grant PRAXIS XXI/BD/19676/99 from FCT

1. Academic and teaching experience

Courses taught in the last 2 years (2008-2010):

- ”Information Systems Modelling”, Professional Master in Information Networking (MSIN), dual degree of Carnegie Mellon and University of Aveiro , Fall 2009.
- “Testes e Qualidade de Software / Software *Quality and Testing*” - 2009/2010 - (undergraduated): Software engineering course focused on Test Driven Development on SOA projects (J2EE) supported on agile methodology and team work.
- “Computação Móvel / *Mobile Computing*”– 2009/2010 - (undergraduated): Basic concepts on mobile computing application development on Android and Windows Mobile environments.
- “Introdução à Computação Móvel / *Introduction to Mobile Computing*” - 2009/2010 - (undergraduated): Basic concepts on mobile computing application development on Android.
- “Engenharia de Software /*Software Engineering”* – 2008/2010 (undergraduated): Software engineering course focused on agile methodology, team work and SOA (J2EE). Concepts on software engineering and architecture
- “Modelação de Sistemas / *Systems modelling”* – 2006 - 2008 (Master in Electrotechnic Engineering and Telecommunications – University of Cabo Verde – ISE / University of Aveiro): Use case and domain modelling using UML

- "Análise e Modelação de Sistemas de informação / *Analysis and modelling of information system*" – 2008 (undergraduated): Use case and domain modelling using UML. Concepts on software engineering and architecture
- "Análise e Modelação de Sistemas / *Analysis and Modelling of Systems*" - 2009
- "Análise e Modelação de Sistemas de Informação /A*nalysis and Modelling of Information Systems", 2008-2009*

Supervisions

- José Gil Monteiro de Carvalho, "Sistema de Gestão de Informação Portuária (SGIP)", Master degree in Electronic and Telecomunications – Information System, (co-supervision), 2010
- Jair José Lopes Delgado, "Sistema de Informação de Apoio à Detecção de Perdas de Energia Eléctrica – O Caso da Electra", Master degree in Electronic and Telecomunications – Information System, (co-supervision), 2010
- Elisabeth Alves Andrade, "Sistema de Informação de Controlo de Assiduidade: Proposta para o caso da UniCV", Master degree in Electronic and Telecomunications – Information System, 2010
- Micael Pedrosa, "A web portal for Portuguese Brain Imaging Network", Integrated Master degree in Computer Engineering and Telematics, University of Aveiro, 2009
- David Pacheco," Ciência 2.0: Partilha de dados científicos na Grid / *Science 2.0: Sharing Scientific Data on the Grid*",Integrated Master degree in Computer Engineering and Telematics, University of Aveiro (co-supervision with Ilídio Oliveira), 2009
- Eduardo Dias," Quantificação tridimensional de movimento em epilepsia", Integrated Master degree in Electronic and Telecomunications, University of Aveiro (co- supervision with João Paulo Cunha), 2009
- Jacek L. Kustra, "Multimodal EEG-fMRI system for the study of epileptogenic focus", Master in BioMedical engineering, University of Aveiro (co-supervision), 2008
- Pedro Bruno Pereira Amaral, "Aplicação para visualização multimodal e manipulação de dados de Electrocorticografia /*Multimodal methods of visualization and manipulation of Electrocorticography data*", Integrated Master degree in Computer Engineering and Telematics, University of Aveiro (co- supervision), 2008

2. Research Interests

- Quantify the human brain motor function in space and time with focus on dynamics in health and in disease (epilepsy and neurodegenerative diseases)
  - Multimodal characterization of brain activity with focus on multimodality integration and brain connectivity studies (functional and structural)
  - Spatio-temporal patterns characterization with focus on cluster analysis and non parametric measures
- Systems modelling and software engineering: system modelling, design patterns, mobile systems
- Grid computing: Distributed Computing and research oriented middleware for Grid use.

3. Research positions

Research proposals (name, reference, funding entity)

- PI in proposal PTDC/SAU-ENB/110687/2009 - "FCMotor: Functional Markers of motor brain activity through synchronous Video-EEG-fMRI methods in health and neurodegenerative diseases" - submitted to FCT, under revision

Member of the following undergoing projects (name, reference, funding entity)

- VitalResponder - CMU-PT/CPS/0046/2008 (Carnegie Mellon - Portugal program)
- MISC - MIT-Pt/TS-ITS/0059/2008 (MIT Portugal program)
- "Rede Nacional de Imagiologia Funcional Cerebral ",REDE/1519/RNIFC/2006 , PROGRAMA NACIONAL DE RE-EQUIPAMENTO CIENTÍFICO, FCT
- BING - GRID/GRI/81833/2006 - Portuguese national GRID iniciative, FCT.
- GERES-med - GRID/GRI/81819/2006, Portuguese national GRID iniciative, FCT.
- MovEpil3D - PTDC/SAU-BEB/72305/2006 – FCT
- "Neural correlates of object recognition: structure-function correlations within the visual ventral stream, striatal and limbic circuits in health and disease", PTDC/PSI/67381/2006 - FCT.
- EELA -2 - 7th Framework Programme, Capacities of the European Commission

Selected collaborations in the projects/proposals:

- Project proposal Healing– "Health Application Layer for Infrastructures using Grids", – IST 2002 (FP6-2002-IST-1 – proposal 27374), European Comission.
- Project Team-HOS - Methodology and Tools for World-best Teamwork in Hospitals - IST-DGXIII (Jan 2000 – Dez 2002).
- Project HANSA - "Healthcare Advanced Networked Systems Architecture" - Projecto Europeu – Telematics DGXIII (Jan 1996 – Dez 1998) - http://www.gesi.it/hansa .

4. Publications

Thesis

Fernandes, J. M. (2007), "EpiGauss: spatio-temporal characterization of brain activity in Epilepsy/EpiGauss: caracterização espacio-temporal da actividade cerebral em Epilepsia", PhD in Electrotecnical Engineering, University of Aveiro, Portugal

Fernandes, J. M. (1998), "MAGOO - Metodologia baseada em Agentes e Orientada por Objectos para resolução de Problemas Distribuídos: uma aplicação à gestão de trânsito/ MAGOO – Agent based methodology and Objected Oriented principles for problem solving: an application to traffic managment", MSc Computer Science, Faculty of Sciences, University of Oporto, Portugal

International journals

Fernandes, J. M., A. Martins da Silva, G. M. Huiskamp, D. N. Velis, I. Manshanden, J. C. de Munck, F. Lopes da Silva and J. P. Cunha (2005). "What Does an Epileptiform Spike Look Like in MEG? Comparison Between Coincident EEG and MEG Spikes", J Clin Neurophysiol **22**(1): 68-73.

Proceedings in international conferences with referee (2007-…)

Cunha J.P.S., Fernandes J.M., Bento V., Paula L., Dias E., Bilgin C., Noachtar S., "2D versus 3D approaches to movement quantification in epileptic seizures: Simulations and real seizures comparative evaluation.", accepted in 9th European Congress on Epileptology, Rhodes, Greece.

Cunha J.P.S., J. M. Fernandes, A. Peters, C. Bilgin, J. Rémi, Z. Mirzadjanona, J.A. Gonzalez-Victores , S. Noachtar (2010) "Quantitative Analysis of Upper Limb Automatisms in Temporal and Frontal Lobe Epilepsy", accepted in 9th European Congress on Epileptology, Rhodes, Greece.

Cunha, J.P.S., S. Tafula, J. M. Fernandes (2010) "3D video-fMRI: Tri-dimensional video-based movement quantification in a 3T fMRI environment", accepted in Human Brain Mapping, Barcelona, Spain.

Oliveira, I.C, L. Alves, E. Dias, D. Pacheco, S. Lima, J. Barros, M.P. Monteiro, J.A. Silva, J.M. Fernandes, J.P.S. Cunha, A. Sousa Pereira (2010), "Automated endoscopic capsule analysis using a Grid computing environment", accepted in IBERGRID'2010, Braga, Portugal.

Oliveira I., J.P.S. Cunha, D. Pacheco, J.M. Fernandes, M. Pedrosa, L. Alves and A. Sousa Pereira (2010) "The Portuguese BING Network: Towards a Brain Imaging Grid Virtual Community", MICCAI-Grid, London, UK, 2009.

Fernandes J.M., S. Tafula, S. Brandão, A. Bastos Leite, I. Ramos and J.P.S. Cunha (2009) "Video-EEG-fMRI: Contribution of in-bore Video for the Analysis of Motor Activation Paradigms.", World Congress on Medical Physics and Biomedical Engineering, September 7 - 12, 2009. Munich, Germany: Springer Berlin Heidelberg, pp. 786-789.

Cunha J.P.S., Vollmar C., J.M. Fernandes and S. Noachtar (2009) "Automated Epileptic Seizure Type Classification through Quantitative Movement Analysis.", World Congress on Medical Physics and Biomedical Engineering, September 7 - 12, 2009. Munich, Germany: Springer Berlin Heidelberg, pp. 1435-1438.

Al-Rawi M.S., J.M. Fernandes, S. Tafula, J.P.S. Cunha (2009) Association Analysis of Biosignals using Self Organizing Maps. World Congress on Medical Physics and Biomedical Engineering, September 7 - 12, 2009. Munich, Germany: Springer Berlin Heidelberg, pp. 2170-2173.

Cunha J. P. S. , J. M. Fernandes, I. Oliveira, M. Pedrosa, L. Alves, and A. Sousa Pereira (2009), "The Portuguese BING network: Towards a brain imaging Grid virtual community," in 3rd Iberian Grid Infrastructure Conference (IberGrid'09) V. Hernández Garcia, G. Barreira, I. Blanquer Espert, and J. Gomes, Eds. Valencia, Spain: NetBiblo S.L., La Coruña, 2009, pp. 96-105.

Pacheco D., I. Oliveira, J. M. Fernandes, and J. P. S. Cunha (2009). "MAGI: A medical application Grid interfacing portal for eScience," in 3rd Iberian Grid Infrastructure Conference (IberGrid'09) V. Hernández Garcia, G. Barreira, I. Blanquer Espert, and J. Gomes, Eds. Valencia, Spain: NetBiblo S.L., La Coruña, 2009, pp. 31-42.

Pedrosa M., L. Alves, I. C. Oliveira, J. M. Fernandes, and J. P. S. Cunha (2009), "A System Architecture for the BING-Brain Image Network Grid," in HEALTHINF 2009 - International Conference on Health Informatics Porto, Portugal: INSTICC, 2009, pp. 276 - 281.

Oliveira I., J. M.Fernandes, L. Alves, A. S. Pereira and J.P. S. Cunha (2008). "GERES-med: An Architecture for Grid-Enabled scientific REpositorieS for medical applications", IberGRID 2008, 12-14 May, Porto, Portugal

Cunha J.P.S., I. Oliveira, J. M. Fernandes, A. Campilho, M, Castelo-Branco, N. Sousa and A. Sousa Pereira (2007), "BING: The Portuguese Brain Imaging Network GRID", IberGRID 2007, 14-16 May, Santiago de Compostela, Spain.

Andrade R., I. Oliveira, J. M. Fernandes and J.P.S. Cunha (2007). "Multi-voxel Non-linear fMRI Analysis: A Grid Computing Approach", IberGRID 2007, 14-16 May, Santiago de Compostela, Spain.

Proceedings in international conferences with referee (poster) (2007-…)

Fernandes J. M. , J. P. S. Cunha, S. Tafula, S. Brandão, A. Bastos Leite, and I. Ramos, "Video-EEG-fMRI: a proximal in-bore Video-EEG system within a 3T MRI scanner," in Proceedings of the 28th International Epilepsy Congress, Budapest, Hungary, 2009.

Cunha J. P. S. , J. M. Fernandes, V. Bento, L. Paula, F. Oliveira, C. Bilgin, and S. Noachtar, "3D Movement Quantification in Epilepsy: New Contribution for Quantitative Semiology Analysis," in Proceedings of the 28th International Epilepsy Congress, Budapest, Hungary, 2009.

Lori N.F. , J.M. Fernandes, A. Bastos-Leite, J.P. Cunha (2008). "Separating sensory and motor BOLD functional MRI activations using q-ball white matter fiber tracking in humans", 12th EFNS Congress, Madrid, Spain

Kustra J. , J. M. Fernandes, and J. P. S. Cunha (2008). "EEG-fMRI Balistocardiogram Removal: A New Non-linear Time Warping Approach", 14th Nordic-Baltic Conference on Biomedical Engineering and Medical Physics (NBC-2008), Riga, Latvia, 2008.

Fernandes J.M., F. Sales and J. P. S. Cunha (2007). "EPIGAUSS: Lateralization value of a new automated analysis software based on spike dipole densities and spatial clustering (1.008)", 2007 Annual Meeting of the American Epilepsy Society Page, October 2007 - Epilepsia Vol. 48 Issue s6, pp 4

Andrade R., Oliveira I., Fernandes J.M., Cunha J. P. S. (2007). "A grid framework for non-linear brain FMRI analysis", Stud Health Technol Inform. 2007;126:299-305

CURRICULUM VITÆ

João M. Fernandes

2010, 08 May

Full name: João Miguel Lobo Fernandes
Birth date: 1968, 19 June
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Academic degrees, Institutions, Fields of study:
• PhD, U.Minho, Informatics / Computer Engineering, May/2000.
• MSc, U.Minho, Informatics / Computing Science, Jul/1994.
• Licenciatura (5-year degree), U.Minho, Systems and Informatics Engineering, Sep/1991.

Current position, Institution: Associate Professor, U.Minho, since Oct/2007.

Previous positions, Institutions:
- Visiting Assistant Professor, Aarhus Universitet, Dep. Computer Science, Denmark, Sep/2006-Jun/2007.
- Invited Assistant Professor, Universidade do Algarve, Faculty of Sciences and Technology, Faro, Portugal, Sep/2004-Jun/2006.
- Post-doctoral Researcher, TUCS, Turku, Finland, Sep/2002-Feb/2003.
- Vice-president of the Engineering Degrees Council, U.Minho, Oct/2004-Sep/2006.
- Director of the 5-year degree in Systems and Informatics Engineering, U.Minho, Jun/2004-Sep/2006.
- Assistant Professor, U.Minho, May/2000–Oct/2007.
- Assistant, U.Minho, Jul/1994–May/2000.
- Teaching Assistant, U.Minho, Nov/1991–Jul/1994.
- Junior Assistant, U.Minho, 1989/90.

Main research area: Software Engineering

Other scientific interests: Embedded Computing, Systems Modelling

Organisation of international scientific conferences:
1. Organising Committee Chair, 31st International Conference on Application and Theory of Petri Nets and Other Models of Concurrency (PETRI NETS 2010), Braga, Portugal, Jun/2010. Proceedings to be published by Springer.
2. Organising Committee Chair, 10th International Conference on Application of Concurrency to System Design (ACSD 2010), Braga, Portugal, Jun/2010. Proceedings to be published by IEEE Computer Society Press.
3. Program Committee Co-chair, 3rd International Summer School on Generative and Transformational Techniques in Software Engineering (GTTSE 2009), Braga, Portugal, Jul/2009.
4. Editor and organiser, Workshop series on Model-based Methodologies for Pervasive and Embedded Software (MOMPES); 6 editions, 2004-2009. Proceedings published by IEEE Computer Society Press, since 2006.
5. Industry Liaison Committee Chair, IEEE Second International Symposium on Industrial Embedded Systems (SIES 2007), Costa da Caparica (Lisbon), Portugal, Jul/2007
6. Organising Committee Co-chair, 5th IFIP International Conference on Distributed and Parallel Embedded Systems (DIPES 2006), Braga, Portugal, Oct/2006. Proceedings published in IFIP series, Springer.
7. Organising Committee Co-chair and Finance chair, 3rd IEEE International Conference on Application of Concurrency to System Design (ACSD 2003), Guimarães, Portugal, Jun/2003. Proceedings published by IEEE Computer Society Press.
8. Program Committee Member of several international conferences and workshops: BM-MDA, CENICS, CONTROLO, CPN, DIPES, DSOA, ENC, ETFA, ICESS, ICSEA, INForum, MOMPES, PETRI NETS,

QUORS, QUATIC, REC, SIES, SPAC, TeaConc, UCAmI, WMUPS.

9. Reviewer for international journals published by IEEE (Computer, Software, Transactions on Computers, Transactions on Software Engineering, Transactions on Knowledge and Data Engineering, Transactions on Industrial Electronics), ACM (Transactions on Embedded Computing Systems), Elsevier (Computers in Industry, Energy, Information Sciences, Integration - the VLSI Journal, Science of Computer Programming), Springer (Software and Systems Modeling, Transactions on Petri Nets and Other Models of Concurrency), and Taylor & Francis (European Journal of Engineering Education).

Most relevant publications (2005-9):

1. Fernandes JM, Sousa SM; PlayScrum - A Card Game to Learn the Scrum Agile Method, 2nd International Conference on Games and Virtual Worlds for Serious Applications (VS-GAMES 2010), Braga, Portugal, IEEE Computer Society Press, pp. 52–9, Mar/2010. doi 10.1109/VS-GAMES.2010.24.
2. Larsen PG, Fernandes JM, Habel J, Lehrskov H, Vos RJC, Wallington O, Zidek J; A Multidisciplinary Engineering Summer School in an Industrial Setting, European Journal on Engineering Education 34(6):511–26, Taylor & Francis, ISSN 0304-3797, Dec/2009. doi: 10.1080/03043790903150687.
3. Ribeiro OR, Fernandes JM; Validation of Scenario-based Business Requirements with Coloured Petri Nets, 4th International Conference on Software Engineering Advances (ICSEA 2009), Porto, Portugal, IEEE Computer Society Press, pp. 250–5, ISBN 978-0-7695-3777-1, Sep/2009. doi 10.1109/ICSEA.2009.45.
4. Gomes L, Fernandes JM (eds.); Behavioral Modeling for Embedded Systems and Technologies: Applications for Design and Implementation, IGI Global, ISBN 978-1-60566-750-8, Jul/2009. This 494-page book is divided in 15 chapters written by well-known professors and experts from industry.
5. Jørgensen JB, Tjell S, Fernandes~JM; Formal Requirements Modeling with Executable Use Cases and Coloured Petri Nets, Innovations in Systems and Software Engineering 5(1):13-25, Springer, Mar/2009. doi 10.1007/s11334-009-0075-6.
6. Fernandes JM, Machado RJ, Seidman S; A Requirements Engineering and Management Training Course for Software Development Professionals, 22th IEEE-CS Conference on Software Engineering Education & Training (CSEE&T 2009), Hyderabad, Índia, IEEE Computer Society Press, pp. 20-5, Feb/2009. doi 10.1109/CSEET.2009.24.
7. Tjell S, Fernandes JM; Expressing Environment Assumptions and Real-time Requirements for a Distributed Embedded System with Shared Variables, Distributed Embedded Systems: Design, Middleware and Resources, Kleinjohann B, Kleinjohann L, Wolf W (eds.), Springer, IFIP 271, pp. 79-88, Sep/2008. doi 10.1007/978-0-387-09661-2_8.
8. Monteiro MP, Fernandes JM; An Illustrative Example of Refactoring Object-oriented Source Code with Aspect-oriented Mechanisms, Software: Practice and Experience 38(4):361–96, Wiley, Apr/2008. doi 10.1002/spe.835.
9. Fernandes JM, Jørgensen JB, Tjell S; Requirements Engineering for Reactive Systems: Coloured Petri Nets for an Elevator Controller, 14th Asia-Pacific Software Engineering Conference (APSEC 2007), Nagoya, Japan, IEEE Computer Society Press, pp. 294--301, Dez/2007. doi: 10.1109/APSEC.2007.81.
10. Fernandes JM, Machado RJ, Teaching Embedded Systems Engineering in a Software-Oriented Computing Degree, 37th Annual ASEE/IEEE Frontiers in Education Conference (FIE 2007), Milwaukee, WI, USA, Oct/2007. doi 10.1109/FIE.2007.4417949.
11. Mashkoor A, Fernandes JM, Deriving Software Architectures for CRUD Applications: The FPL Tower Interface Case Study, 2nd International Conference on Software Engineering Advances (ICSEA 2007), Cap Esterel, France, IEEE Computer Society Press, Aug/2007. doi 10.1109/ICSEA.2007.25.
12. Ribeiro OR, Fernandes JM, Translating Synchronous Petri Nets into PROMELA for Verification of Behavioural Properties, 2nd IEEE International Symposium on Industrial Embedded Systems (SIES 2007), Costa da Caparica, Portugal, IEEE, Jul/2007. doi 10.1109/SIES.2007.4297344.
13. Fernandes JM, Tjell S, Jørgensen JB, Ribeiro OR, Designing Tool Support for Translating Use Cases and UML 2.0 Sequence Diagrams into a Coloured Petri Net, 6th International Workshop on Scenarios and State Machines (SCESM 2007), within the 29th International Conference on Software Engineering (ICSE 2007), Minneapolis, MN, USA, IEEE Computer Society Press, May/2007. doi: 10.1109/SCESM.2007.1.
14. Fernandes JM, Machado RJ, A Two-Year Software Engineering M.Sc. Degree designed under the Bologna Declaration Principles, 1st International Conference on Software Engineering Advances (ICSEA 2006), Tahiti, French Polynesia, IEEE Computer Society Press, Oct-Nov/2006. doi: 10.1109/ICSEA.2006.13.
15. Fernandes JM, Machado RJ, Monteiro PA, Rodrigues H, A Demonstration Case on the Transformation of Software Architectures for Mobile Applications, From Model-Driven Design to Resource Management for Distributed Embedded Systems, Kleinjohann B, Kleinjohann L, Machado RJ, Pereira C, Thiagarajan PS (eds.), Springer, IFIP 225, pp. 235–44, Oct/2006, ISBN 0-387-39361-7.
16. Fernandes JM, Lilius J., Truscan D., Integration of DFDs into a UML-based Model-Driven Engineering

Approach, Software and Systems Modeling (SoSyM) 5(4):403–28, Springer, Dec/2006. doi: 10.1007/s10270-006-0013-0.
17. Duarte FJ, Fernandes JM, Machado RJ, Business Modeling in Process-Oriented Organizations for RUP-based Software Development, Reference Modeling for Business Systems Analysis, Fettke P, Loos P (eds.), Idea Group, Hershey, Pennsylvania, USA, chap. 5, pp. 98–117, Oct/2006.
18. Machado RJ, Fernandes JM, Monteiro PA, Rodrigues H, Refinement of Software Architectures by Recursive Model Transformations, 7th International Conference on Product Focused Software Process Improvement (PROFES 2006), Münch J, Vierimaa M (eds.), Amsterdam, The Netherlands, Springer, LNCS 4034, pp. 422–8, Jun/2006. doi: 10.1007/11767718_38.
19. Monteiro MP, Fernandes JM, Towards a Catalogue of Refactorings and Code Smells for AspectJ, Transactions on Aspect-Oriented Software Development I, Springer, Rashid A, Aksit M (eds.), LNCS 3880, pp. 214–58, Mar/2006. doi: 10.1007/11687061 7.
20. Monteiro MP, Fernandes JM, Refactoring a Java Code Base to AspectJ: An Illustrative Example, 21st IEEE International Conference on Software Maintenance (ICSM 2005), Budapest, Hungary, IEEE Computer Society Press, pp. 17–26, Sep/2005. doi: 10.1109/ICSM.2005.75.
21. Machado RJ, Fernandes JM, Integration of Embedded Software with Corporate Information Systems, From Specification to Embedded Systems Application, Rettberg A, Zanella MC, Rammig FJ (eds.), pp. 169–78, Springer, Aug/2005. doi: 10.1007/11523277 17.
22. Machado RJ, Ramos I, Fernandes JM, Specification of Requirements Models, Engineering and Managing Software Requirements, Aurum A., Wohlin C. (eds.), chap. 3, pp. 47–68, Springer, Jul/2005. doi: 10.1007/3-540-28244-0_3.
23. Machado RJ, Fernandes JM, Monteiro PA, Rodrigues H, Transformation of UML Models for Service-Oriented Software Architectures, 12th IEEE International Conference on the Engineering of Computer Based Systems (ECBS 2005), Greenbelt, Maryland, USA, pp. 173–82, IEEE Computer Society Press, Apr/2005. doi: 10.1109/ECBS.2005.73.
24. Ribeiro OR, Fernandes JM, Pinto L, Model Checking Embedded Systems with PROMELA, 12th IEEE International Conference on the Engineering of Computer Based Systems (ECBS 2005), Greenbelt, Maryland, USA, IEEE Computer Society Press, pp. 378–85, Apr/2005. doi: 10.1109/ECBS.2005.53.
25. Monteiro MP, Fernandes JM, Towards a Catalog of Aspect-Oriented Refactorings, 4th International Conference on Aspect-Oriented Software Development (AOSD 2005), Tarr P (ed.), Chicago, Illinois, USA, ACM Press, pp. 111–22, Mar/2005. doi: 10.1145/1052898.1052908.
26. Fernandes JM, Duarte FJ, A Reference Framework for Process-Oriented Software Development Organizations, Software and Systems Modeling (SoSyM) 4(1):94–105, Springer, Feb/2005. doi: 10.1007/s10270-004-0063-0.

PhD and MSc supervisions:
1. PhD in Information Systems, Francisco José Monteiro Duarte, Automated Information Systems Generation for Process-Oriented Organizations. Started in Oct/2006.
2. PhD in Informatics, Óscar Rafael da Silva Ferreira Ribeiro. Animation and Validation of Reactive Software from Scenario-Based Models. Finished in Dec/2009.
3. PhD in Informatics, Miguel Jorge Tavares Pessoa Monteiro, Refactorings to Evolve Object-Oriented Systems with Aspect-Oriented Concepts. Finished in Jul/2005.
4. MSc in Informatics, Sónia Marlene Pereira de Sousa, Play Scrum - Um Jogo para a Aprendizagem do Método Ágil Scrum. Finished in Dec/2009.
5. MSc in Informatics, Susana de Jesus Prozil Rodrigues, Algoritmos de decisão multi-critério para atribuição de prioridades a requisitos de software. Finished in Dec/2009.
6. MSc in Informatics, Mauro Jorge Pereira Almeida, Classificação e Comparação de Métodos Ágeis de Desenvolvimento de Software. Finished in Jan/2009.
7. MSc in Informatics, Paula Alexandra Fernandes Monteiro, Model-based Transformations for Pervasive Software Architectures. Finished in May/2006.
8. MSc in Informatics, Óscar Rafael da Silva Ferreira Ribeiro, Model Checking of Petri Nets for Embedded Systems. Finished in Jul/2005.
9. MSc in Informatics, Francisco José Monteiro Duarte. Process-Oriented Software Engineering. Finished in Jul/2002.

Funded projects:
1. UMinho Principal Researcher, AMADEUS: Aspects and Compiler Optimizations for Matlab System Development, Dec/2007-Nov/2009. Programme FCT (PTDC/EIA/70271/2006). Partners: Inesc-Porto (coordination; João M.P. Cardoso), U.Minho, Uninova, Deimos.

2. UMinho Principal Researcher, SOFTAS: Software Development with Aspects, Set/2005-Dez/2007. Programme FCT (POSI/EIA/60189/2004). Partners: FCT-UNL (coordination; Ana M. Moreira), U.Minho, IP Beja, IP Castelo Branco, LINCIS, NAV.
3. Researcher, uPAIN: Ubiquitous Solutions for Pain Monitoring and Control in Post-Surgery Patients, Jan/2005-Fev/2008. Programme AdI/Ideia 2004 (AdI/IDEIA/70/2004/3.1B/00364/007). Partners: U.Minho (coordination; Ricardo J. Machado e Armando Pinto de Almeida), Hospital da Senhora da Oliveira de Guimarães, MobiComp - Computação Móvel.
4. Researcher, STACOS: Standard-Based Cooperative Software, Jan/2004-Abr/2007. Programme FCT Sapiens 2002 (POSI/CHS/48875/2002). Partners: U.Minho (coordination; Ricardo J. Machado), FCUL, INESC-ID, IDITE-Minho, LINCIS, ATX Software.
5. Researcher, PPC-VM: Portable Parallel Computing based on Virtual Machines, Mar/2004-Feb/2007. Programa FCT Sapiens 2002 (POSI/CHS/47158/2002). Partners: U.Minho (coordination; João L. Sobral).
6. Principal Researcher, METHODES: Methodologies and Tools for Developing Embedded Systems, Fev/2002-Jan/2006. Programme FCT Sapiens 2001 (POSI/CHS/37334/2001). Partners: U.Minho, ISEP, IDITE-Minho.

Courses taught in the last years:
In the academic years 2009/10, I was responsible for a optional MAP-i course on “Research Topics in Software Engineering” (9 students). In the academic years 2007/08 and 2008/09, I was responsible for a optional MAP-i course on “Model-Driven Software Engineering” (around 10 students) and a graduate course on “Requirements Engineering and Management” (around 15 students). I was also involved in lecturing a undergraduate course on “Computing System” (around 330 students).
In the academic year 2006/07, I was on a sabbatical leave at the Dep. of Computer Science at University of Aarhus, Denmark, as an invited assistant professor. I had no teaching duties in that period.