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2005 Report of Activities

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1 CENTRIA 2005 report of activities

1.1 General comments on the 2005 activity

The present activity report was unanimously approved by the Scientific Committee of CENTRIA end of April 2006. The plans approved in 2004 for 2005 were on the whole successfully carried out.

In 2005, the centre's Director was the recipient of FCT's Stimulus to Excellence award (cf. <https://www.fct.mctes.pt/pt/concursosabertos/Estimulo/>), the only computer scientist to receive it so far.

During academic year 2003/04, the "European MSc in Computational Logic" was launched, between UNL and four other European universities, and supported at UNL by CENTRIA members¹. In 2004/05 it has continued on, with partial funding from the European Erasmus Mundus programme. We recall the objective of the program is to impart to the student a profound theoretical and practical knowledge required for professional practice in the field, to give him a survey of the individual disciplines of Computational Logic and to develop his ability to work according to scientific methods. In addition, the student is given the opportunity to plan his studies to fit a particular practical application. To acquire practice-oriented knowledge he may choose appropriate combinations of modules. By means of visits abroad and English as the language of instruction, the student is to be prepared for the increasing internationalism of science, commerce and industry.

Also noteworthy, a 3-year European funded Asia-Link project "Computational Logic as a Foundation for Computer Science and Intelligent Systems" begun in September 04, continued on in academic year 04/05, in partnership with T.U. Dresden, Germany, U. Indonesia² at Jakarta, and T.U. Hanoi, Vietnam. We recall the objective of the project is to promote the area of formal computational foundations of logic, computer science and intelligent systems, i. e., the area of Computational Logic, in South East Asia. It aims at upgrading the staff of the Asian partners within a joint team schema, joint supervision of MSc and PhD students within a sandwich schema, courses of European professors and lectures at the Asian universities, the organization of international summer schools, the development of curricula for single modules at the Asian universities. In particular, in 2005, a course was given by us at the T.U. Hanoi on Knowledge Representation and Reasoning with Logic Programming (<http://centria.di.fct.unl.pt/lmp/Hanoi.KRR/index.html>), and another one, on "Computational Logics for Knowledge Representation" at the Summer School (<http://www.hut.edu.vn/khoavien/khoacongnghethongtin/summerschool.html>). Several students and professors from Vietnam and Indonesia were received at CENTRIA.

Also of general significance, the 4-year European funded project, "REWERSE - Reasoning on the Web with Rules and Semantics", involving all areas of CENTRIA, which was initiated in March 04 (Cf. <http://www.rewerse.org/> for project details and our activities in 2005), continued on. REWERSE strives for advanced Web systems and applications sometimes referred to as Semantic Web. The term refers to one of the major current endeavours world wide in Information Technologies. Its goal may be briefly described as enriching the existing Web with meta-data and data processing (and meta-data processing) so as to provide Web-based systems with advanced (so-called intelligent) capabilities, in particular with context-awareness and decision support, strengthening a person centred, everyday use of the Web.

CENTRIA's participation involves a coordinating role in one of the major work-packages, "Evolution and Reactivity". CENTRIA is a major participant in REWERSEs Education and Training work-package, besides its major participation in other important work-packages mentioned in the project, namely "Rule Markup", and "Bio-informatics", so that all of CENTRIA's areas are involved.

It is noteworthy that, pursuant to its new strategic ends, the centre hired or renewed in 2005, 4 postdocs, from 4 countries: Portugal, China, Italy, and the USA.

The reconfiguration of MEI, the department's MSc in Computer Science, began in 2003/04, continued in 2004/05 and 2005/2006, and afforded us with the opportunity to include in it AI

¹See <http://ssdi.di.fct.unl.pt/masters/mcl/> for details.

²See <http://europa.eu.int/comm/europeaid/projects/asia-link/index.en.htm> for project details and our activities in 2005.

and Information Technology profiles, the latter including a semantic net component, also figuring prominently in the recent Computational Logic MSc.

A staff Assistant Professor with competence in Bio-informatics was hired by the computer science department. This will help the Centre to follow a recommendation by the FCT international evaluators of CENTRIA, and recognizes the importance of the research direction initiated by us. Our evolution can then best be gauged by comparing the plans with the present report: an overall positive evolution. The global indicators in the tables in Section 7 show and highlight, with respect to 2005 compared with 2004, that:

- Regarding publications: There is overall steady progress, as can be seen in the graphs, as we continue to recover from the leaving of four members in 2000, and the overall number of members has not increased since 2004. Not shown in the graphs, are two new internationally published books, arising out of the PhD theses of two centre members. The total number of publications increased from 62 to 67. The number of journal publications increased from 9 to 11. Nevertheless, we should still be increasing journal publications, and we will continue to do so by means of continued funding incentives to members accomplishing so. The number of publications in SCI (Science Citation Index - SCI) venues has increase from 22 to 25. We hope more of these will find their way into journals shortly. The publications in collaboration with non-members have remained high, but with some decrease from 40 to 34 (still, a second all time high). This was probably a side-effect of the Portuguese AI conference event in December 2005, as CENTRIA only authors publications increased substantially, from 22 to 33.
- Regarding Projects: The number of ongoing projects remains roughly at the same level, with a slight decrease from 16 to 15. It should be noted however that the national call for projects from FCT was much delayed and underfunded.
- Regarding Events Organization: This figure went from a high level of 4 in 2003, to an exceptional 7 in 2004, and an exceptional 6 in 2005. This has provided an added impact on the visibility of the centre.
- Postgraduate MSc and PhD students: The overall attraction of the centre for these post-graduate students continues. Their overall of number has increased from 23 in 2003 to 32 in 2004, to 37 in 2005. As expected, the launching of the international MSc course in Computational Logic started 2004, produced a substantial increase in ongoing MSc thesis, from 20 to 25. Their overall number will tend to increase further in 2006. number of PhD students diminished from 14 to 12, because 2 foreign students (from Brazil and Mexico) gave up. One must however understand though that (during the two PSD/CDS governments) the national funding for PhD scholarships has not only diminished, but the usual two calls per year were reduced to 1 in 2004, and 1 in 2005.

Other indicators, including a more detailed examination of types of publication, and publications by each subarea, are to be found in the annexes, and mentioned in each of the subarea reports.

The 2005 budget was executed according to plan, and the funding has been finally received on time with the new government.

The distribution of the running funds among the members was made as usual on the basis of publication productivity, in number and type, according to a pre-defined set of rules we have been using over the past years. We intend to make good in the 2006 budget the revision of points assigned to each publication type to further encourage publication in journals and highly recognized conferences.

The Advisory Committee was duly notified of last year's report and informally congratulated us on the activities reported. No specific recommendations were made.

The detailed rendition of each of the subareas' activities is to be found below. A number of scientific bridges were pursued between the subareas, to reinforce the unity and cross-fertilization within the CENTRIA. The activities of 2006 and beyond will further promote the construction of these bridges.

1.2 Subarea: Knowledge Representation and Reasoning, and Logic Programming

The research work on “Knowledge Representation and Reasoning, and Logic Programming” continued in 2005 on the foundations of logic programming for knowledge representation and reasoning, applications and implementation of logic programming systems, as can be gauged from the publications. As reported last year, and in accordance with a significant participation in an European project in the area, applications in the domain of the Semantic Web were especially pursued.

The scientific projects covering this activity were REWERSE, FLUX, SIIUE, and the network Network of Excellence in Computational Logic - CoLogNet. One new collaboration project, KRENI, was approved in 2005, to start in 2006.

Fourth International Workshop on Computational Models of Scientific Reasoning and Applications (CMSRA-IV), Lisbon, Portugal, September 21-23, 2005.

CENTRIA members co-organized the following scientific meetings in this area:

- Luís Moniz Pereira and Gregory Wheeler co-organized the Fourth International Workshop on Computational Models of Scientific Reasoning and Applications (CMSRA-IV), Lisbon, Portugal, September 21-23, 2005.
- Reinhard Kahle organized PCC '05 - Proof, Computation, Complexity 4th International Workshop July 16-17, 2005, Lisbon, Affiliated Workshop of ICALP '05.

Also, Carlos Viegas Damásio has been designated local organizer of the REWERSE Reasoning Web 2006 Summer School, which will take place at FCT/UNL in September 2006.

The education and training aspects have been covered by our MSc in Computer Science, the Masters in Computational Logic being put together in the context of CoLogNet, as explained in the introduction, and with support from Erasmus Mundus and Asia Link European programmes.

In the context of Semantic Web development, one line of research was that of considering the problem of how to design a general web rule language that can be used for these and for future emerging purposes. Given the great diversity of rule concepts and existing rule languages, such a language will consist of several overlapping sublanguages that share a common metamodel. The development of this rule metamodel is a difficult conceptualisation and integration problem [20]. We have also considered the extension of the Resource Description Framework with two forms of negation, in order to be able to express negation information in the Semantic Web. In [33] we extend RDF graphs with weak and strong negation, as well as derivation rules. The ERDF stable model semantics of the extended framework (Extended RDF) is defined, extending RDF(S) semantics. A distinctive feature of our theory, which is based on partial logic, is that both truth and falsity extensions of properties and classes are considered, allowing for truth value gaps. Our framework supports both closed-world and open-world reasoning through the explicit representation of the particular closed-world assumptions and the ERDF ontological categories of total properties and total classes. The extension of this work to the Ontology Web Language is underway with the collaboration with Aida Vitória from the Linköping University, Sweden. The use of both forms of negation introduces problems with conflicting information, moreover if uncertainty is involved. Thus, we have developed a powerful mathematical formalism for dealing simultaneously with default, paraconsistency, and uncertainty and reasoning. Results are provided about how our semantical framework deals with inconsistent information and with its propagation by the rules of the program [11]. Moreover, this framework is being extended for dealing with disjunctive information, where new results have been reported in [29]. This will be part of João Alcântara's PhD. thesis to be submitted during the year of 2006. The visibility of the work in uncertainty, allowed us to join the Fuzzy RuleML technical group (<http://image.ntua.gr/FuzzyRuleML/>). Moreover, the successful collaboration with the team of Universidad de Málaga, Spain, has continued with the 2 week visit by Jesús Medina. Important results regarding the proof of soundness and completeness of first-order tabulation proof-procedures have been achieved, which have been accepted for publication in 2006.

Mainly within the project FLUX, that finished September 2005, foundational work on logic programming updates has been developed, and applications studied. Regarding foundational work, a study of the semantics of logic programs updates has been stabilized [12], and generalized to the multidimensional case [37]. An operational semantics [36] and corresponding implementation [35] for the semantics has been developed. Also studied were applications to the domain of action languages [31]. Moreover, two lines of research on the application of update in the fields on Multi-Agent Systems and Recommender Systems began. No results were published in 2005, but several papers have already been accepted for publication in 2006.

Regarding developments in Multi-Agent Systems it is also worth reporting that João Leite was invited speaker at the AgentLink III Technical Forum Group on Programming Multiagent Systems (PROMAS) which resulted in a joint publication with several international authors, accepted to appear in 2006 [81], and the preparation of a tutorial on Programming Multi-Agent Systems, jointly with Rafael Bordini (University of Durham), Mehdi Dastani (University of Utrecht, The Netherlands) and Michael Winikoff (RMIT University, Australia), which was accepted to be part of the tutorial program of the 2006 International Conference on Autonomous Agents and Multi-Agent Systems, AAMAS'06.

This work on updates of knowledge has continued to be applied to the context of the Semantic Web, the above mentioned IST project Rewerse, where CENTRIA heads the working group of "Evolution and Reactivity". In this track, the work has concentrated in the task of specifying a general model, language and architecture for reactivity and evolution in the Semantic Web. For this, a general framework was defined [30]. This general ontology-based framework and architecture, relies on Event-Condition-Action (ECA) rules for dealing with the challenges posed by evolution and reactivity in the Semantic Web, namely in what concerns the abstraction levels of behaviour and the heterogeneity of languages and behaviour (besides the heterogeneity of data) [62]. Markup languages have been defined for this [61]. It is also worth mentioning that a course was given in the Summer School "Reasoning Web 2005" in this area [22].

Regarding foundational work in the area of semantics of normal logic programs, a major effort was made to define and implement a new semantics for normal logic programs, which was the subject of a MSc, and published as [67]. This work is now being extended, by a new MSc student concerning a "Revise Well-founded Semantics".

Work on preferences, their application to theory revision, and their debugging, resulted in a number of publications [82, 47, 48].

A new research avenue was inaugurated by applying generalized behaviour networks inspired by Logic Programming to hybrid control. This will continue to be the subject of future work [46].

In 2005 was completed an important stage in a research plan, which was a 3 year project to investigate logical representation of statistical reasoning. This culminated in an axiomatization of evidential probability with Teng and Kyburg that also opens up research on sub-System P logics. These logics have weaker transitivity properties than cumulative inference relations and capture the (often)-incomplete structure of statistical reasoning, highlighting the fundamental differences between probabilistic logics and logics for probabilities. This was mainly the work of FCT sponsored postdoctoral researcher Dr. Gregory Wheeler.

Regarding implementations, the SIIUE project has been continuing to expand its scope. SIIUE is based on the ISCO language, which integrates several paradigms around Logic Programming. Developments were made in 2005 which delve further into the specification and implementation of a new language, ISTO, based on our previous work and making use of an improved form of Contextual Logic Programming together with Constraint reasoning which will lead to a powerful tool for the construction of real-world information systems. Work has also started in the direction of making ISTO and Contextual Logic Programming an appropriate formalism in which to specify and implement agents in a Semantic Web setting.

1.3 Subarea: Intelligent Information Systems

In this area, research work was done in following topics: tools for semantic web, integration of heterogeneous databases, intelligent agents for automatic classification of documents, definition

of semantic web ontologies, and natural language dialogue systems for information retrieval from intelligent Information systems.

The research work was partly developed within the following projects: REWERSE - Reasoning in The Web with Rules and Semantics (IST506779); ABC Intelligent Access to Legal Knowledge Bases (POSI-I&D in consortium ref. 6192); DIRPI - Development and Integration of Resources for Information Retrieval (ICCTI/CAPES bilateral project); SIIUE - Univ. Évora's Integrated Information System (funded by Univ Évora); AJACS - Yet Another Java Constraint Programming System (POSI/40197/CHS/2002); LOIS - Lexical Ontologies for legal Information Sharing (Funding EEC); DOMIR - Dialogs and Ontologies for Multimedia Information Retrieval (POSC/EIA/61109/2004).

The NoE project REWERSE - Reasoning on the Web with Rules and Semantics", continued for its second year, with most relevant results for all CENTRIA areas.

The ABC - Intelligent Access to Legal Knowledge Bases - has finish in October with a prototype of search engine and 5 publications [26, 70, 25, 50, 52, 71, 51, 72]. The topic of the master thesis of José Palmeiro also contributes to this project results.

DIRPI - Development and Integration of Resources for Information Retrieval - International cooperation under the DIRPI project presents results in the following topics: Question answer systems, Anaphora resolution, Automatic Discourse Segmentation [32, 69]. The following PhD students contributed to this areas: Ana Luisa Leal, Cássia Santos.

The SIIUE project has been continuing to expand its scope. SIIUE is based on the ISCO language, which integrates several paradigms around Logic Programming. Developments were made in 2005 which delve further into the specification and implementation of a new language, ISTO, based on our previous work and making use of an improved form of Contextual Logic Programming together with Constraint reasoning which will lead to a powerful tool for the construction of real-world information systems. Work has also started in the direction of making ISTO and Contextual Logic Programming an appropriate formalism in which to specify and implement agents in a Semantic Web setting. Related to the SIIUE project, the development of Question-Answer System with clarification dialogues has a prototype for evaluation, this work has been done as part of Luis Quintano PhD thesis (this year advances are accepted for publication in a 2006 conference). The following master thesis topic fit into this project goals: Pedro Patinho, Nuno Lopes, Claudio Fernandes, Tiago Fernandes and Nuno Morgadinho.

Work has concluded within the AJACS project. The hardware issues related to the gradual deterioration of the machines affected to the project were partly solved by the acquisition of a replacement cluster, even if undersized. Nevertheless, a basis for the definition of an efficient computational model for AJACS, based on Distributed Shared Memory (DSM) systems, has been established and a prototype has been developed. The principal result of the project was Ligia Ferreira's Ph.D. thesis. The master thesis topic of Luis Almas carries on with some of this project's goals.

Work within LOIS - Lexical Ontologies for Information Sharing - gives rise to the juridical taxonomy developments documented in [44].

During 2004 the project DOMIR - Dialogs and Ontologies for Multimedia Information Retrieval - was submitted and approved by FCT. This is a joint project of CENTRIA and INESCIN/FEUP coordinated by the INESCIN/FEUP team. The topics of the following PhD thesis are integrated in this project areas: Teresa Gonçalves[50, 52, 51], Luis Quintano[25] and José Saias[26, 32].

Last year, a prototype of a system for Question-Answer was built using results from our research in the topics: definition of semantic web ontologies, and natural language dialogue systems for information retrieval from intelligent Information systems. The following master thesis topics are related to this area: Ana Aires, Gustavo Laboreiro, Pedro Salgueiro.

This QA system was built in order to participate in the CLEF - Cross Language Evaluation Forum (<http://www.clef-campaign.org>) that, in cooperation with Linguatca, added the Portuguese language as query language and target documents language. This year the target documents were a collection of news published by the Portuguese newspaper "Público" and Brazilian "Folha de S. Paulo" from 1994 to 1995. The campaign consisted in getting answers to 200 questions (Wh-questions) supported by a sentence of the target set of documents. Our QA system,

an evolution of the 2004 QA system [25] (*Alentejo*) achieved 33% of correct and well supported answers [72, 69, 71, 70].

The SIUE project will continue its deployment and expansion; as previously, this will foster the appearance of shorter subprojects, some of which are application-related while others are more research-oriented. The latter include the integration of Contextual Logic Programming (CxLP) concepts in ISCO and the development of language features to support:

- Temporal information. This has started already, some work being reported in [65].
- Schema evolution.
- Reliable and convenient access control.
- Semantic Web integration. Work on this line has started already.

The bilateral “Extensions au Logiciel Libre GNU Prolog” project which took place in 2003/2004 is to be renewed starting in 2007. Expected results include the development of an advanced object-oriented logic programming system based on GNU Prolog, somewhat along the lines of the current work on ISCO and Contextual Logic Programming [28].

In the area of intelligent agents for automatic classification of documents we had use the Linear Support Vector Machine paradigm applied to datasets written in the English and the European Portuguese languages – the Reuters and the Portuguese Attorney General Offices datasets, respectively. We are proposing new kernels using linguistic information. The results reported in [50, 52, 51]

The work developed by the master student Rui Gomes, Knowledge representation approach to closed loop control, was not developed within a supported project but contributed with the results described in [73]. We intend to continue research within this area in a near future.

Helena Barbas has collaborated in the Project - InStory - Interactive Personalized Mobile Storytelling, coordinated by CITI / Nuno Correia (<http://img.di.fct.unl.pt/InStory/>) in the project areas:

- creation of a narrative structure, story plot, character, game and quiz;
- elaboration of a game route and screen instructions for a specific geographical space (Regaleira).

1.4 Subarea: Soft Computing and Constraints

Work in constraints area has proceeded during 2005 with some focus on Bioinformatics. In particular an improved version of a system that predicts the interaction of proteins (protein docking) was implemented with constraint solving techniques, that greatly improved its efficiency [54]. This version has been included in the new version 3.0 of the Chemera system [55], that is being used by researchers in Biochemistry [19, 16]. This system is also being adapted to the Semantic Web, namely by including its access to a number of bioinformatic web servers (PDB, SCOP, Pfam, Dssp, etc.), using the technology being developed in project Rewerse.

In addition to an implementation of a distributed version of a Constraint solver using Java technology, which were the subject of Lúcia Ferreira’s PhD Thesis, research on general constraint solvers has been carried out under project PRACTIC. A new solver is being developed that is able to cope not only with a variety of general purpose domains (finite domains, sets or booleans) but also on some specialised domains such as 3D volumes for used in bioinformatics applications. A preliminary version was finished with support to finite domains, sets and booleans [43].

This work was presented in BeyondCP’05, a CP’05 satellite workshop, organised by Francisco Azevedo et al. [3] that was one of the two events organised by members of CENTRIA regarding constraint programming, the other being the ACM/SGPLAN Symposium on Declarative Programming, PPDP’05 [6]. Constraint and other declarative programming paradigms were also applied in a number of applications, namely on general planning [34], and on application of constraints declaration (and solving) in XSL to optimize pagination output of typical B2C documents [57].

Constraint solving on continuous domains has mainly focussed on an improved version of work on constraints to model differential equations and possible applications in Biomedical applications [15]. A project in this area, PRECISE, has been accepted for funding that will extend the paradigm of constraint solving to preferred regions within the safe subdomains (modeling preferences and/or likelihoods), that will extend the Ph.D. research published in 2005 [1]. Still in continuous domains, previous research on minimal adaptation of overconstrained linear problems has been continued, namely reagrdng the conditions of applicability [14] and theoretical properties of the model [13].

In the context of the RENA Project, an important project in the area of Machine Learning, the research activity has mainly focused on the continuation on the development of fuzzy clustering techniques for the problem of colour image segmentation from sea surface temperature (SST) maps. Early in 2005, as a final output of her Ph.D. work on Fuzzy clustering, Susana Nascimento thesis have been published [2]. Fuzzy clustering methods were applied to the segmentation of 16 SST images for the automatic identification of areas covered by upwelling waters in the coastal ocean of Portugal. In particular, the application of the fuzzy c-means algorithm, did find partitions that closely defined the upwelling areas, by successfully identifying upwelling boundary regions in 79% of the SST images [63]. Neural Networks were also used in the framework of RENA project for classification according to satellite image context has been applied (e.g. [42, 41]).

The interest in developing neural models for classification using linguistic context (e.g. [24]) has also motivated the start of research in *Tagged Text Mining*. In order to do so, a first prototype of an intelligent system for data mining in tourist data ([64]) was developed. Preliminary research done with Doctor Yiling Yang on user profile modeling was published ([77]). Eventual relations with hybrid self-organizing maps are also being studied, namely as a result of joint work done with former CENTRIA researcher Doctor Chen Ning ([64]). As a result of this first effort, both the technology and knowledge for developing research into text mining are becoming available in CENTRIA, and we hope that new work in applying neural networks for classification based on context will follow.

More fundamental work has also been pursued. Preliminary studies were done on the use of spiking models for representing knowledge that could depend of time in neural networks ([74] and genetic algorithms for estimating the best architecture for a neural network ([42]). Also, as a side result, data mining techniques were applied to the data available of one of the courses taught by CENTRIA researchers ([59]).

Finally, it is worth mentioning the investigation the logical representation of statistical reasoning, mainly the work of postdoctoral researcher Dr. Gregory Wheeler, already described in the KRR area, but with a significant intersection with the Soft Computing and Constraints area.

2 List of ongoing projects in 2005

Name	CoLogNet - European Network of Excellence in Computational Logic
Status	Ongoing (started January 2001, finished June 2005)
Funding Institution	EU-IST
Funding for 2005	no extra cost
Principal researcher	Luís Moniz Pereira (national part)
Participants (ours)	CENTRIA
Description:	Computational Logic has outgrown its humble beginnings and early expectations by far: with close to ten thousand people working worldwide in research and development of logic-related methods, with several dozen international conferences and workshops and more than one hundred international and national scientific societies related to research in logic addressing the growing richness and diversity of the field, and with the foundational role and importance these methods now assume in mathematics, computer science, artificial intelligence, cognitive science, linguistics and many engineering fields –where logic-related techniques are used inter alia to state and settle correctness issues – the field has diversified in ways that the pure logicians working in the early decades of the last century could have hardly anticipated. http://www.eurice.de/colognet/ .
Results	Participating in the Executive Council. Setting up of a distributed master in Computational Logic with T.U.Dresden. Participation in network activities. Final report
Name	REWERSE - Reasoning on the Web with Rules and Semantics
Status	Ongoing (started March 1st 2004, for 4 years)
Funding Institution	EU-IST
Funding for 2005	75.000 (our part)
Principal researcher	Luís Moniz Pereira (national part)
Participants (involving all 3 major areas of CENTRIA)	CENTRIA
Description:	REWERSE strives for advanced Web systems and applications sometimes referred to as Semantic Web, a term coined in 2001 by Tim Berners-Lee et. al. in the article The Semantic Web in Scientific American. This term refers to one of the major current endeavours world wide in Information Technologies. Its goal may be briefly described as enriching the existing Web with meta-data and data processing (and meta-data processing) so as to provide Web-based systems with advanced (so-called intelligent) capabilities, in particular with context-awareness and decision support, strengthening a person centred, everyday use of the Web. Cf. http://www.rewerse.org/ .
Results	Meetings, deliverables, and publications, in the area of our responsibility for Working Group Evolution and Reactivity. And according to participation in WGs Education and Training, Rule Markup Languages, Towards a Bioinformatics Semantic Web, and Personalised Information Systems.

Name	International M.Sc. Program in Computational Logic
Status	Ongoing (started September 2004, for 5 academic years)
Funding Institution	EU Erasmus Mundus
Funding for the duration	75.000 (our part)
Principal researcher	Luís Moniz Pereira (national part)
Participants	UNL, TU Dresden, U. Bolzano, TU Wien, UP Madrid
Description:	One major activity was to setup and launch a joint distributed european MSc degree in Computational Logic with 4 other partners, initiated in the context of project CoLognet. This involved the creation of a new MSc in Computational Logic at UNL. Cf. http://ssdi.di.fct.unl.pt/masters/mcl/ .
Results	Project continued in academic years 04/05 and 05/06. Several coordinating meetings. Yearly report.

Name	Computational Logic as a Foundation for Computer Science and Intelligent Systems
Status	Ongoing (started September 2004, for 3 years)
Funding Institution	EU-IST Asia-Link/VN/001
Funding for the duration	75.000 (our part)
Principal researcher	Luís Moniz Pereira (national part)
Participants	CENTRIA, TU Dresden, U. Indonesia, TU Hanoi
Description:	The objective of the project is to promote the area of formal computational foundations of logic, computer science and intelligent systems, i. e., the area of Computational Logic, in South East Asia. The European partners are already engaged in an effort to turn Europe into the leading place for education and training in this area. The three-year project aims at upgrading the staff of the Asian partners within a joint team schema, joint supervision of MSc and PhD students within a sandwich schema, courses of European professors and lectures at the Asian universities, the organisation of international summer schools, the development of curricula for single modules at the Asian universities, and the incorporation of video-teaching methods in cooperation and teaching. Cf. http://www.computational-logic.org/content/projects/asialink/ .
Results	Received several students from Vietnam and Indonesia for 6 month stays. Hosted a professor from T.U. Hanoi for 1 month. Taught a course at T.U. Hanoi in Jan/Feb05. Participated with one lecturer in the Summer School at T.U.Hanoi, August 05. Project coordination meetings. Yearly report.

Name	Knowledge Representation with Negative Information (KRENI)
Status	Ongoing (submitted and approved in 2005, to start January 2006, for two years)
Funding Institution	Council of Rectors (CRUP)
Funding for the duration	2.300 (our part)
Principal researcher	Luís Moniz Pereira (national part)
Participants	UNL, UPM Madrid
Description:	The study of the negative information, its formalization and the way of representing and implementing this information in Logic Programming
Results	Accepted proposal.

Name	PRACTIC: Processing and Reuse of Advanced Computational Techniques to Improve Constraint Solving
Status	Ongoing (end December 2007)
Funding Institution	Fundação para a Ciência e Tecnologia
Participant Institutions	CENTRIA and INESC-ID
Funding for 2005	15744 Euro (our part)
Principal researcher	Pedro Barahona
Participants	Francisco Azevedo, Marco Correia
Description	The project aims at developing advanced computing techniques, focussing in constraint programming, and to show how their integration with other techniques such as automated learning and meta-heuristics optimisation, can be used to solve a very important problem: the determination of protein structure from Nuclear Magnetic Resonance (NMR) spectroscopy
Results	1 publications, 1 prototype (by CENTRIA members of the project).
Name	PRECISE - in Science and Engineering
Reference	POSI/EIA/59786/2004
Status	Ongoing (start April 2005; end March 2008)
Funding Institution	FCT-MCES
Participant Institutions	CENTRIA
Funding for FCT/UNL in 2005	11500
Principal researcher	Pedro Barahona
CENTRIA Participants	Pedro Barahona, Jorge Cruz
Description	This project aims at a) investigating possible ways of introducing probabilities (or mere likelihoods) in the continuous constraint framework; b) developing extensions to our previous work in constraint propagation techniques in continuous constraints to address this extended framework; and c) Evaluate and validate this research, in a number of applications, namely biomedical and engineering.
Results	No results so far
Name	FLUX
Status	Finished
Start Date	2002
End Date	September 2005
Budget in 2005	5.400 Euro
Funding Institution	POSI
Principal researcher	José Alferes
Participants	CENTRIA and Declarativa - Serviços de Informática Lda.
Description	This project aims at establishing a flexible declarative language for the specification of dynamic knowledge, and to apply it to realistic application domains.
Results	In the 3 year of duration 1 book, 2 book chapter, 6 journal papers, 45 conference paper were published with result of this project. Moreover 1 PhD thesis and 4 MSc thesis were successfully defended.

Name	Remote Detection of Mediterranean Water Eddies in the Northeast Atlantic (RENA)
Reference	PDCTE/CTA/49945/2003-RENA
Status	Ongoing
Funding Institution	FCT/MCES
Funding in 2005	5200 Euro (our part)
Principal researcher	Isabel Ambar (Instituto de Oceanografia-Faculdade de Ciencias /Universidade de Lisboa)
CENTRIA Participants	Nuno C. Marques, Susana Nascimento, Marco Castellani, Armando Fernandes, 1 scholarship student
Description	Establishment of a methodology for the remote identification of Mediterranean Water (MW) eddies with a synergistic use of satellite remote sensing data from the ERS and ENVISAT missions, ocean circulation numerical models and artificial neural networks. A census of MW eddies in the Northeast Atlantic and the estimation of their generation frequency will be attempted based on the results. The project also aims at determining the physical mechanisms controlling the interaction between the MW undercurrent/eddies and the coastal upwelling current system off the Iberian Peninsula.
Results	5 publications, 2 prototypes.
Name	ABC – Intelligent Access to Knowledge Bases
Status	Finished on October 2005
Budget in 2005	20.000 Euro
Funding Institution	Agência de Inovação
Principal Researcher	Paulo Quaresma
Participants	Irene Rodrigues, and 2 scholarship students
Description	Development of a web application for information retrieval in the juridical domain, specialized for the Portuguese language.
Results	5 publications in 2005.
Name	DIRPI – Desenvolvimento e Integração de Recursos para a Pesquisa de Informação
Status	Ongoing (2002–2006)
Funding Institution	GRICES/CAPES (3k euro in 2005)
Principal Researcher	Paulo Quaresma
Participants	Renata Vieira (UNISINOS/Br)
Description	Develop natural language processing tools for the Portuguese language in order to increase the power of information retrieval systems.
Results	2 papers and 1 visit in 2005.
Name	LOIS – Lexical Ontologies for Information Sharing
Status	ongoing
Funding Institution	European Commission (eContent program)
Funding for 2005	25000 euros
Principal researcher	Paulo Quaresma
Participants	2 scholarship students
Description	Development of an ontology for the legal domain in six EU languages.
Results	1 publication in 2005.

Name	DOMIR – Dialogs and Ontologies for Multimedia Information Retrieval
Status	Started in March 2005, finished in 2007
Funding Institution	FCT POSC/EIA/61109/2004 (90000 euros)
Principal researcher	Maria Cristina de Carvalho Alves Ribeiro (INESCN)
Participants	Irene Pimenta Rodrigues, Paulo Miguel Torres Duarte Quaresma, José Miguel Gomes Saias, Luis Jorge Catela Quintano
Description	To go beyond text retrieval, the analysis of document components such as audio or image segments is required. The Metamedia prototype (FEUP) currently incorporates the extraction of audiovisual features and the automatic association of the corresponding descriptors to the document. Further work is required on audiovisual extraction, in order to create more expressive descriptors. Ontologies will be used at this point: both the inclusion of audiovisual descriptors in ontologies and their combination with domain ontologies will be explored. A second component is dialog management. The retrieval task can be significantly improved by gathering information from the user interaction and analyzing the dialog to extract user intentions and plans. Retrieval is an intrinsically imprecise task and therefore this line has to be complemented by appropriate evaluation procedures and tools. A third line of research is the refinement of the database model to encompass the association of metadata to objects at different levels, the compliance with audiovisual standards and the use of heterogeneous descriptors in the computation of similarity measures for retrieval. Audiovisual descriptors are commonly multi-dimensional and quantitative; the similarity measures required in retrieval open a large ground for new approaches.
Results	Working prototype
Name	AJACS – Yet Another Java Constraint Programming System
Status	Started in July 2002, finished in 2005
Funding Institution	FCT SAPIENS (POSI)
Principal researcher	Salvador Abreu
Participants	Irene Rodrigues Lígia Ferreira
Description	This project aims at developing a dialect for the Java programming language, implementing the Constraint Programming paradigm over a distributed network of inexpensive workstations. We developed a model for the representation of CSPs (Constraint Satisfaction Problems), susceptible of being efficiently implemented in a network-aware object-oriented programming language, such as Java. This model was the object of a prototype implementation on a distributed system, which was to be made up of a cluster of 16 nodes, which will extend the presently existing cluster of 8 nodes. There are two prototypes: a sequential and a parallel one.
Results	Working prototype and one PhD. thesis.
Name	SIHUE.sac – Universidade de Évora’s Integrated Information System
Status	Ongoing since 2003
Funding Institution	Universidade de Évora
Principal researcher	Salvador Abreu
Participants	Vitor Nogueira
Description	Continued design and implementation of a logic language to build web-based information systems, featuring transparent use of heterogeneous databases. Application to the academic management of the University (Évora).
Results	several publications and a production system.

3 List of M.Sc. and Ph.D. students and topics in 2005

3.1 M.Sc. Students

Name	Matthias Knorr
Degree	M.Sc.
Supervisor	Reinhard Kahle (co-supervised by Steffen Hölldobler (Dresden))
Topic	A Comparative Study of Disjunctive Well-Founded Semantics
Start date	2005
Finish date	May 2006 (expected)
Name	Gil Loureiro
Degree	M.Sc.
Supervisor	Francisco Azevedo
Topic	Formatação otimizada de Documentos usando Restrições no XSL:FO
Start date	October 2003
Finish date	July 2006 (expected)
Name	Luís Filipe Silva
Degree	M.Sc. in Applied Artificial Intelligence, UNL
Supervisor	Luís Moniz Pereira and Dov Gabbay (Kings College, London)
Topic	Law of Evidence (Computational View)
Start date	March 2004
Finish date	April 2005
Name	Alexandre Miguel Pinto
Degree	M.Sc.
Supervisor	Luís Moniz Pereira
Topic	Explorations in Revised Stable Models a new semantics for logic programs
Start date	September 2004
Finish date	June 2005
Name	Luís Rodrigues Soares
Degree	M.Sc.
Supervisor	Luís Moniz Pereira
Topic	Revise Well-founded Semantics a new semantics for logic programs
Start date	November 2005
Finish date	October 2006 (expected)
Name	Rui Miguel Martinho Dias Jorge
Degree	M.Sc.
Supervisor	Carlos Viegas Damásio
Topic	Diagnostic system of protection systems of electrical power distribution networks
Start date	March 2004
Finish date	July 2005
Name	Pedro Patinho
Degree	MSC.
Supervisor	Salvador Abreu
Topic	Extensions to the GNU Prolog system
Start date	December 2002
Finish date	September 2006 (expected)

Name	Luis Almas
Degree	MSC.
Supervisor	Salvador Abreu
Topic	Distributed constraint programming toolkits
Start date	September 2005
Finish date	September 2006 (expected)
Name	Nuno Lopes
Degree	MSC.
Supervisor	Salvador Abreu
Topic	Semantic web aspects for the ISCO language (front ends)
Start date	September 2005
Finish date	Late 2006 / Early 2007 (expected)
Name	Claudio Fernandes
Degree	MSC.
Supervisor	Salvador Abreu
Topic	Semantic web aspects for the ISCO language (back ends)
Start date	September 2005
Finish date	Late 2006 / Early 2007 (expected)
Name	Tiago Fernandes
Degree	MSC.
Supervisor	Salvador Abreu
Topic	Contextual Logic Programs for Distributed Systems
Start date	September 2005
Finish date	Late 2006 / Early 2007 (expected)
Name	Nuno Morgadinho
Degree	MSC.
Supervisor	Salvador Abreu
Topic	Distributed Multithreaded GNU Prolog
Start date	September 2005
Finish date	Late 2006 / Early 2007 (expected)
Name	Marta Botelho Pantoquilha
Degree	M.Sc.
Supervisor	João Mpura Pires
Topic	A Space Environment Information System for Mission Control Purposes: System Analysis and Data Integration Design.
Start date	September 2004
Finish date	October 2005
Name	Nuno Miguel Soares Datia
Degree	M.Sc.
Supervisor	João Moura-Pires
Topic	Decision Support Techniques Applied to Audiometry Data
Start date	February 2004
Finish date	March 2006
Name	Nuno Carlos Santos Simões Viana
Degree	M.Sc.
Supervisor	João Mpura Pires
Topic	A Analysis, Design and Development of an Extraction, Transformation and Loading Software Architecture for Space-Oriented Activities with Real-time Constraints.
Start date	September 2004
Finish date	January 2006

Name	Rosa Isabel Alves Cordeiro Matias
Degree	M.Sc.
Supervisor	João Moura Pires
Topic	Integration of geographical information in OLAP systems.
Start date	September 2004
Finish date	July 2006 (expected)
Name	Ana Sofia Carapinha da Cunha Lopes
Degree	M.Sc.
Supervisor	João Moura-Pires
Topic	Decision Support System for Environmental Data
Start date	September 2004
Finish date	October 2006
Name	José Palmeiro
Degree	M.Sc.
Supervisor	Paulo Quaresma
Topic	A BDI architecture for information retrieval
Start date	October 2004
Finish date	December 2006
Name	Ana Aires
Degree	M.Sc.
Supervisor	Paulo Quaresma
Topic	Anaphora resolution in Portuguese Documents
Start date	October 2004
Finish date	December 2006
Name	Pedro Salgueiro
Degree	M.Sc.
Supervisor	Paulo Quaresma
Topic	A Question-Answering System for the Portuguese Language
Start date	October 2004
Finish date	February 2005
Name	José Carlos Almeida Santos
Degree	M.Sc.
Supervisor	Pedro Barahona
Topic	Mining Protein Data Banks for Structure Prediction
Start date	February 2005
Finish date	June 2006 (expected)
Name	Vivek Nigam
Degree	M.Sc.
Supervisor	João Leite
Topic	Dynamic Logic Programming for 3APL
Start date	October 2005
Finish date	May 2006
Name	Martina Babini
Degree	M.Sc. (University of Bologna)
Supervisor	João Leite
Topic	Dynamic Logic Programming for Recommender Systems
Start date	October 2005
Finish date	June 2006

Name	Rui Ernesto da Silva Gomes
Degree	M.Sc.
Supervisor	Irene Rodrigues (e Luis Mendonça Rato)
Topic	Representação do Conhecimento para Análise de Sistemas de Controlo
Start date	October 2003
Finish date	May 2005
Name	Gustavo Alexandre Laboreiro
Degree	M.Sc.
Supervisor	Irene Pimenta Rodrigues
Topic	Métodos para extracção e representação de conhecimento de bases de documentos usando ontologias.
Start date	October 2005
Finish date	June 2006

3.2 Ph.D. Students

Name	João Fernando Lima Alcântara
Degree	Ph.D.
Supervisor	Carlos Viegas Damásio and Luís Moniz Pereira
Topic	Paraconsistent Disjunctive Extended Logic Programs
Start date	September 2001
Finish date	September 2006 (expected)
Name	Alexandre Miguel Pinto
Degree	Ph.D.
Supervisor	Luís Moniz Pereira
Topic	Ontologia para linguagens de especificação de acções para regras reactivas
Start date	September 2005
Finish date	August 2009 (expected)
Name	Federico Banti
Degree	Ph.D.
Supervisor	José Alferes
Topic	A language for executing and reasoning about evolution of logic based agents
Start date	October 2003
Finish date	March 2007 (expected)
Name	Lígia Ferreira
Degree	Ph.D.
Supervisor	Salvador Abreu
Topic	Constraint Programming Toolkits for Parallel Execution
Start date	June 1999
Finish date	April 2005
Name	Teresa Gonçalves
Degree	Ph.D.
Supervisor	Paulo Quaresma
Topic	Automatic Classification of Portuguese Documents
Start date	October 2003
Finish date	December 2006 (expected)

Name	José Saias
Degree	Ph.D.
Supervisor	Paulo Quaresma
Topic	Automatic construction of ontologies and their application in the semantic web context
Start date	October 2004
Finish date	December 2007 (expected)
Name	Ana Luis Leal
Degree	Ph.D.
Supervisor	Paulo Quaresma
Topic	Rhetorical Structures and Question Answering Systems
Start date	October 2004
Finish date	September 2008 (expected)
Name	Cássia Santos
Degree	Ph.D.
Supervisor	Paulo Quaresma
Topic	A Multi-Agent Architecture for Question-Answering
Start date	October 2005
Finish date	September 2008 (expected)
Name	Vítor Nogueira
Degree	Ph.D.
Supervisor	Salvador Abreu and Gabriel David (Faculty of Engineering, University of Porto)
Topic	Constraint and Logic Languages for Heterogeneous Database Systems
Start date	October 2001
Finish date	2007 (expected)
Name	Valeria Magalhães Pequeno
Degree	Ph.D.
Supervisor	João Moura Pires
Topic	Specification, maintenance and implementation of materialized object views in an object-relational data warehouse
Start date	July 2005
Finish date	September 2008 (expected)
Name	Luis Quintano
Degree	Ph.D.
Supervisor	Irene Pimenta Rodrigues
Topic	Natural Language Dialogues for IR from BD
Start date	October 2003
Finish date	October 2007 (expected)
Name	Marco Vargas Correia
Degree	Ph.D.
Supervisor	Pedro Barahona
Topic	Advanced Techniques for Improving Constraint Solving in Finite Domains
Start date	October 2004
Finish date	December 2008 (expected)

4 Publications

4.1 Books

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- [2] S. Nascimento. *Fuzzy Clustering via Proportional Membership Model*, volume 119 of *Frontiers of Artificial Intelligence and Applications*. IOS Press <http://www.iospress.nl/>, 2005.

4.2 Edited books and journal special issues

- [3] Francisco Azevedo, Carmen Gervet, and Enrico Pontelli, editors. *Proceedings of the First International Workshop on Constraint Programming Beyond Finite Integer Domains, BeyondFD'2005 workshop notes*, 2005.
- [4] Wilfried Buchholz and Reinhard Kahle, editors. *Festschrift on the occasion of Helmut Schwichtenberg's 60th birthday*, volume 133(1-3) of *Annals of Pure and Applied Logic*. 2005. Special Issue.
- [5] Bernd Buldt, Volker Halbach, and Reinhard Kahle, editors. *Reflections On Frege and Hilbert*, volume 147(1) of *Synthese*. 2005. Special Issue.
- [6] Amy Felty and Pedro Barahona, editors. *Proceedings of PPDP05, 7th ACM/SIGPLAN International Symposium on Principles and Practice of Declarative Programming*, Lisbon, Portugal, July 2005. ACM.
- [7] Reinhard Kahle, editor. *Intensionality*, volume 22 of *Lecture Notes in Logic*. ASL and AK Peters, 2005.
- [8] João Alexandre Leite, Andrea Omicini, Paolo Torroni, and Pinar Yolum, editors. *Declarative Agent Languages and Technologies II, Second International Workshop, DALT 2004, New York, NY, USA, July 19, 2004, Revised Selected Papers*, volume 3476 of *Lecture Notes in Computer Science*. Springer, 2005.
- [9] João Alexandre Leite and Paolo Torroni, editors. *Computational Logic in Multi-Agent Systems, 5th International Workshop, CLIMA V, Lisbon, Portugal, September 29-30, 2004, Revised Selected and Invited Papers*, volume 3487 of *Lecture Notes in Computer Science*. Springer, 2005.
- [10] L. M. Pereira and G. Wheeler, editors. *Procs. Computational Models of Scientific Reasoning and Applications (CMSRA-IV)*, Lisbon, Portugal, September 21–23 2005. Universidade Nova de Lisboa. Edition of Non Commercially Available Proceedings by UNL.

4.3 In International Journals

- [11] João Alcântara, Carlos Viegas Damásio, and Luís Moniz Pereira. An encompassing framework for paraconsistent logic programs. *J. Applied Logic*, 3(1):67–95, 2005.
- [12] José Júlio Alferes, Federico Banti, Antonio Brogi, and João Alexandre Leite. The refined extension principle for semantics of dynamic logic programming. *Studia Logica*, 79(1):7–32, 2005.
- [13] Paula Amaral and Pedro Barahona. Connections between the total least squares and the correction of an infeasible system of linear inequalities. *Linear Algebra and its Applications*, 395:191–210, 2005.
- [14] Paula Amaral and Pedro Barahona. A framework for optimal correction of inconsistent linear systems. *Constraints*, 10(1):67–86, January 2005.

- [15] Jorge Cruz and Pedro Barahona. Constraint reasoning in deep biomedical models. *Journal of Artificial Intelligence in Medicine*, 34:77–88, May 2005.
- [16] A. Impagliazzo, L. Krippahl, and M. Ubbink. Pseudoazurin : Nitrite reductase interactions. *ChemBioChem*, 6:1648–1653, 2005.
- [17] T. V. Maia and A. Cleeremans. Consciousness: converging insights from connectionist modeling and neuroscience. *Trends Cogn Sci*, 9(8):397–404, 2005. 1364-6613 (Print) Journal Article Review.
- [18] T. V. Maia and J. L. McClelland. The somatic marker hypothesis: still many questions but no answers. *Trends Cogn Sci*, 9(4):162–4, 2005. 1364-6613 Journal Article.
- [19] Palma PN, Lagoutte B, Krippahl L, Moura JJ, and Guerlesquin F. Synechocystis ferredoxin/ferredoxin-nadp(+)-reductase/nadp+ complex: Structural model obtained by nmr-restrained docking. *FEBS Lett*, 579(21):4585–90, August 2005.
- [20] Gerd Wagner, Carlos Viegas Damásio, and Grigoris Antoniou. Towards a general web rule language. *Int. J. of Web Engineering and Technology*, 2:181–206, December 22 2005.
- [21] Gregory Wheeler. On the structure of rational acceptance: Comments on hawthorne and bovons. *Synthese*, 144(2):287–304, 2005.

4.4 Book chapters

- [22] J. J. Alferes and Wolfgang May. Evolution and reactivity for the web. In Norbert Eisinger and Jan Maluszynski, editors, *Reasoning Web*, volume 3564 of *Lecture Notes in Artificial Intelligence*, pages 134–172. Springer, 2005.
- [23] Reinhard Kahle. Unendlichkeit. In W. Spohn, P. Schroeder-Heister, and E. Olsson, editors, *Logik in der Philosophie*, volume 6 of *Philosophische Impulse*. Synchron, 2005. 337–348.
- [24] Nuno C. Marques and Gabriel Lopes. *A Língua Portuguesa no Computador*, chapter Etiquetação Morfosintática com Redes Neurais. As Faces da Linguística Aplicada. Mercado de Letras, S. Paulo, Brasil, 2005.
- [25] Paulo Quaresma, Luis Quintano, Irene Rodrigues, and Pedro Salgueiro. The university of évora approach to qa@clef-2004. In C. Peters, P. Clough, J. Gonzalo, G. Jones, M. Kluck, and B. Magnini, editors, *Multilingual Information Access for Text, Speech and Images*, Lecture Notes in Computer Science LNCS 3491, pages 534–543. Springer, 2005. Revised and selected papers of the 5th Workshop of the Cross-Language Evaluation Forum, CLEF.
- [26] José Saias and Paulo Quaresma. A methodology to create legal ontologies in a logic programming information retrieval system. In R. Benjamins, P. Casanovas, A. Gangemi, and B. Selic, editors, *Law and the Semantic Web*, Lecture Notes in Computer Science LNCS 3369, pages 185–200. Springer-Verlag, 2005.
- [27] Gregory Wheeler. Computing, philosophy and cognition. King’s College London, London, 2005.

4.5 In Proceedings of International Conferences

- [28] Salvador Abreu and Vítor Nogueira. Using a Logic Programming Language with Persistence and Contexts. In Masanobu Umeda and Armin Wolf, editors, *Proceedings of the 16th International Conference on Applications of Declarative Programming and Knowledge Management (INAP 2005)*, Fukuoka, Japan, October 2005. Waseda University.

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- [30] J. J. Alferes, Ricardo Amador, and Wolfgang May. A general language for evolution and reactivity in the semantic web. In Francois Fages and Sylvain Soliman, editors, *Principles and Practice of Semantic Web Reasoning PPSWR'05*, volume 3703 of *Lecture Notes in Computer Science*, pages 101–115. Springer, 2005.
- [31] J. J. Alferes, F. Banti, and A. Brogi. From logic programs updates to action description updates. In J. Leite and P. Torroni, editors, *Computational Logic in Multi-Agent Systems, 5th International Workshop, CLIMA V – Revised Selected and Invited Papers*, volume 3387 of *Lecture Notes in Artificial Intelligence*, pages 52–77. Springer, 2005.
- [32] Isa Alves, Rove Chishman, Paulo Quaresma, and José Saias. Busca e extração de informações através de pergunta e resposta: uma nova concepção na web. In *TIL – III Workshop em Tecnologias da Informação e da Linguagem Humana, XXV Congresso da Sociedade Brasileira de Computação*, pages 2218–2227, São Leopoldo, RS, Brasil, July 2005. SBC – Sociedade Brasileira de Computação.
- [33] Anastasia Analyti, Grigoris Antoniou, Carlos Viegas Damásio, and Gerd Wagner. Stable model theory for extended RDF ontologies. In Yolanda Gil, Enrico Motta, V. Richard Benjamins, and Mark A. Musen, editors, *The Semantic Web - ISWC 2005, 4th International Semantic Web Conference, ISWC 2005, Galway, Ireland, November 6-10, 2005, Proceedings*, volume 3729 of *Lecture Notes in Computer Science*, pages 21–36. Springer, 2005.
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4.6 Other publications

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5 Missions

Salvador Abreu

- Sitges, Spain, October 2005: Salvador Abreu and Vitor Nogueira
Purpose: participation in the ICLP'05 conference.
- Kitakyushu, Japan, October 2005: Salvador Abreu
Purpose: participation in the INAP'05 conference.

José Júlio Alferes

- Munich, Germany, March 2005
Purpose: Participation in the annual meeting of project Rewerse, and the meeting of the I5 working group on Evolution and Reactivity.
- Munich, Germany, May 2005
Purpose: Participation in the review meeting of project.
- Skovde, Sweden, June 2005
Purpose: Participation and organization of a meeting WP I5, Evolution and Reactivity, of the project Rewerse.
- Sliema, Malta, July 2005
Purpose: Lecture given in the “Reasoning Web 2005 Summer School”.
- Hanoi, Vietnam, August 2005
Purpose: Course given in the Summer School on Computational Logics, and meeting of Asia-Link project.
- Diamante, Italy, September 2005
Purpose: Participation in the LPNMR'05 conference, and in a review panel of IST-FET projects.
- Ayia Napa, Cyprus, October 2005
Purpose: Participation in the ODBase'05 conference.
- Galway, Ireland, November 2005
Purpose: Participation in the RuleML'05 conference.

João Lima Alcântara

- Sitges, Spain, October 2005
Purpose: presentation of a paper at International Conference on Logic Programming, ICLP'2005.

Francisco Azevedo

- Lisbon, July 2005
Purpose: Participation in 7th International Conference on Principles and Practice of Declarative Programming (PPDP'2005)
- Sitges, Spain, October 1st, 2005
Purpose: Participation in The Fourth International Workshop on Modelling and Reformulating Constraint Satisfaction Problems (a CP'05 workshop) and Chairing of 1st International Workshop on Constraint Programming Beyond Finite Integer Domains (BeyondFD'05)
- Sitges, Spain, October 2-5, 2005
Purpose: Participation in Eleventh International Conference on Principles and Practice of Constraint Programming (CP'05)

- Covilhã, Portugal, December 2005
Purpose: Participation in 2nd Portuguese Conference on Artificial Intelligence (EPIA 2005) with paper presentation at General Artificial Intelligence Workshop (GAIW 2005)

Federico Banti

- Diamante, Italy, September 2005
Purpose: Participation in the LPNMR'05 conference
- Covilhã, Portugal, December 2005
Purpose: Participation in EPIA05, the Portuguese international AI conference.

Pedro Barahona

- Munich, February 2005
Purpose: Participation the General Meeting of the Rewerse project
- Lisbon, July 2005
Purpose: Participation in PPDP'05, 7th International SIGPLAN Conference on Principles and Practice of Declarative Programming
- September, Paris 2005
Purpose: Participation in a consortium meeting at Dassault, to prepare a FET proposal for Mixed Constraints
- Sitges, Spain, October 2005
Purpose: Participation in CP'05, 11th International Conference on Principles and Practice of Constraint Programming, and satellite Workshops.
- Edinburgh, December 2005
Purpose: Participation the Meeting of the A2 WG (Bioinformatics)of the Rewerse project

Marco Castellani

- Covilhã, December 2005
Purpose: Participation in EPIA 2005, 12th Portuguese Conference on Artificial Intelligence.

Marco Correia

- Acquafredda di Maratea, Italy, September 2005
Purpose: Participation in the First International Summer School on Constraint Programming
- Sitges, Spain, October 2005
Purpose: Participation in CP'05, 11th International Conference on Principles and Practice of Constraint Programming, and satellite Workshops.

Jorge Cruz

- Lisbon, July 2005
Purpose: Participation in PPDP'05, 7th International SIGPLAN Conference on Principles and Practice of Declarative Programming
- September, Paris 2005
Purpose: Participation in a consortium meeting at Dassault, to prepare a FET proposal for Mixed Constraints
- Sitges, Spain, October 2005
Purpose: Participation in CP'05, 11th International Conference on Principles and Practice of Constraint Programming, and satellite Workshops.

Carlos Viegas Damásio

- Munich, Germany, December 2005
Purpose: Participation in face-to-face meeting with the co-ordinator of Working Group I1 of (REWERSE)
- Maia, Portugal, December 2005, 1 day
Purpose: Visit to installations of portuguese company EFACEC.

Pierangelo DellAcqua

- Barcelona, Spain, September 2005
Purpose: participate in the 2nd Intl. Conf. on Informatics in Control, Automation and Robotics (ICINCO'05).
- Covilhã, Portugal, December 2005
Purpose: participate in the 12th Portuguese Intl. Conf. on Artificial Intelligence (EPIA'05).

Gabriela Guimarães

- Bari, Italy, June 2005
Purpose: Participation in 18th Intl. Conference on Industrial and Engineering Applications of Artificial Intelligence and Expert Systems, IEA/AIE05.

Reinhard Kahle

- Oberwolfach, Germany, March 2005
Purpose: Research at the *Mathematisches Forschungsinstitut Oberwolfach*
- Nancy, France, May 2005
Purpose: Visit of Guillaume Bonfante and Jean-Yves Marion, LORIA, as part of the project *Teorias e linguagens de programação para computações com recursos limitados* within the *Programa PESSOA 2005/2006* of *GRICES - EGIDE*.
- Konstanz, Germany, September 2005
Purpose: Participation and Talk at the meeting *Der Konstruktivismus in der Philosophie im Ausgang von Wilhelm Kamlah und Paul Lorenzen*
- Lisbon, Portugal, November 2005
Purpose: Participation and Talk at the *18º Encontro do Seminário Nacional de História da Matemática*

Ludwig Krippahl

- Munich, February 2005
Purpose: Participation the General Meeting of the Rewerse project
- Sitges, Spain, October 2005
Purpose: Participation in CP'05, 11th International Conference on Principles and Practice of Constraint Programming, and satellite Workshops.
- Edinburgh, December 2005
Purpose: Participation the Meeting of the A2 WG (Bioinformatics) of the Rewerse project

João Leite

- Covilhã, Portugal, December 2005
Purpose: Participation in EPIA05, the Portuguese international AI conference.
- Ljubljana, Slovenia, February/March 2005
Purpose: Invited Speaker at AgentLink III Technical Forum Group on Programming Multiagent Systems (PROMAS)

Tiago Vaz Maia

Tiago Vaz Maia

- Washington, D.C., November 12-16, 2005
Purpose: Participation in Neuroscience (the 35th Annual Meeting of the Society for Neuroscience)
- Washington, D.C., November 10-11, 2005
Purpose: Participation in the Computational Cognitive Neuroscience Conference
- Okinawa, Japan, July 1-10, 2005
Purpose: Participation in the Okinawa Computational Neuroscience Course

Nuno C. Marques

- Covilhã, December 2005
Purpose: Participation in EPIA 2005, 12th Portuguese Conference on Artificial Intelligence.

Rita Maceira Martins

- Covilhã, December 2005
Purpose: Participation in EPIA 2005, 12th Portuguese Conference on Artificial Intelligence.

Susana Nascimento

- London, September 2005
Purpose: Participation in UKCI05, UK Workshop on Computational Intelligence.

Luís Moniz Pereira

- Hanoi, Vietnam, January/February 2005
Purpose: Teach a course on Knowledge Representation and Reasoning with Logic Programming at Hanoi T.U. in context of a European Asia Link project.
- Bolzano, Italy, February 2005
Purpose: Meeting of the Coordinating Committee of the European MSc in Computational Logic.
- Munich, Germany, March 2005
Purpose: Annual general meeting of the European REWERSE project.
- Lisbon, Portugal, June 2005
Purpose: Meeting of the Coordinating Committee of the European MSc in Computational Logic.
- Lisbon, Portugal, September 2005
Purpose: Participation in CMSRA05, the international workshop on Computational Modelling of Scientific Reasoning and Applications.
- Linköping, Sweden, September/October 2005
Purpose: Preparation of the Postgraduate Education curriculum on the Semantic Web, in the context of the Education and Training work-package of the European REWERSE project.
- Madrid, Spain, December 2005
Purpose: Meeting of the Coordinating Committee of the European MSc in Computational Logic.
- Covilhã, Portugal, December 2005
Purpose: Participation in EPIA05, the Portuguese international AI conference.

Alexandre Pinto

- Munich, Germany, March 2005
Purpose: Annual general meeting of the European REWERSE project.
- Lisbon, Portugal, September 2005
Purpose: Participation in CMSRA05, the international workshop on Computational Modelling of Scientific Reasoning and Applications.
- Covilhã, Portugal, December 2005
Purpose: Participation in EPIA05, the Portuguese international AI conference.

João Moura Pires

- Covilhã, December 2005
Purpose: Participation in EPIA 2005, 12th Portuguese Conference on Artificial Intelligence.
- Madrid, Spain, December 2005
Purpose: Participation in a meeting of SESS Project
- Madrid, Spain, September 2005
Purpose: Participation in a meeting of SESS Project
- Madrid, Spain, Mars 2005
Purpose: Participation in a Final meeting of SEIS Project

Paulo Quaresma

- Brussels, Belgique, December 2005
Purpose: Participation in JURIX 2005: The 18th Annual Conference on Legal Knowledge and Information Systems.
- Bologna, Italy, June 2005
Purpose: Participation in the 10th International Conference on Artificial Intelligence and Law.

Irene Rodrigues

- Viena, Austria, Setembro 2005
Purpose: Participation in CLEF 2005, Cross Language System Evaluation Forum.

Gregory Wheeler

- Austin, Texas, May 2005.
Purpose: Participation in the Second Austin-Berkely Formal Epistemology Workshop (FEW 2005).
- London, July 2005.
Purpose: Participation in Probability and Logic (Prolog 2) hosted by the London School of Economics.

6 Visitors

Renata Vieira , UNISINOS, S. Leopoldo, Rio Grande do Sul, Brasil, 2 weeks, October 2005.
Project GRICES/CAPEs. Development of specialized tools for natural language processing.

Dewi Mairiza , University of Indonesia, May-November 2005. Research on Logic and Constraint Programming, in preparation for future PhD thesis.

Nguyen Hieu , Technical University of Hanoi, Vietnam, 6 months, September 2005/February 2006. Collaboration in the context of a European Asia Link project.

Nguyen Thanh Thuy , Technical University of Hanoi, Vietnam, 1 month, July/August 2005.
Collaboration in the context of a European Asia Link project.

- Pierangelo DellAcqua** , Linköping University, Sweden, 1 month, July 2005. Collaboration in joint research on preferences, theory revision, and hybrid control.
- Steffen Hölldobler** , Technical University of Dresden, Germany, 4 days, June 2005. Meeting of the Coordinating Committee of the European MSc in Computational Logic.
- Bertram Fronhöfer** , Technical University of Dresden, Germany, 4 days, June 2005. Meeting of the Coordinating Committee of the European MSc in Computational Logic.
- Manuel Carro** , Polytechnic University of Madrid, Spain, 4 days, June 2005. Meeting of the Coordinating Committee of the European MSc in Computational Logic.
- Enrico Franconi** , Free University of Bolzano, Italy, 4 days, June 2005. Meeting of the Coordinating Committee of the European MSc in Computational Logic.
- Vito Borelli** , European Commission, Brussels, 4 days, June 2005. Meeting of the Coordinating Committee of the European MSc in Computational Logic.
- Choh Man Teng** , Institute for Man-Machine Cognition, Pensacola, Florida USA, 1 month, October/November 2005, Collaboration in joint research in probabilistic default logic.
- Jesús Medina** , Universidad de Málaga, 2 weeks, September 2005.
Work on the proof of soundness and completeness of first-order tabulation proof procedures.
- Aida Vitória** Linköping University, 1 month, July 2005
Research on the use of Rough Sets for Semantic Web Reasoning.
- Indra Adnyana** Asialink student, 6 months, 2005.
Study and implementation of Prolog based Semantic Web tools.
- Teddy Seidenfeld** , H.A. Simon Professor of Statistics and Philosophy, Carnegie Mellon University, 3 days, September 2005.
Invited Speaker for CMSRA.
- Wiebe van der Hoek** , Professor of Computer Science, University of Liverpool, 2 days, September 2005.
Invited Speaker for CMSRA-IV.

7 CENTRIA evolution graphics in 2005

