

Commenced Publication in 1973

Founding and Former Series Editors:
Gerhard Goos, Juris Hartmanis, and Jan van Leeuwen

Editorial Board

David Hutchison

Lancaster University, UK

Takeo Kanade

Carnegie Mellon University, Pittsburgh, PA, USA

Josef Kittler

University of Surrey, Guildford, UK

Jon M. Kleinberg

Cornell University, Ithaca, NY, USA

Friedemann Mattern

ETH Zurich, Switzerland

John C. Mitchell

Stanford University, CA, USA

Moni Naor

Weizmann Institute of Science, Rehovot, Israel

Oscar Nierstrasz

University of Bern, Switzerland

C. Pandu Rangan

Indian Institute of Technology, Madras, India

Bernhard Steffen

University of Dortmund, Germany

Madhu Sudan

Massachusetts Institute of Technology, MA, USA

Demetri Terzopoulos

New York University, NY, USA

Doug Tygar

University of California, Berkeley, CA, USA

Moshe Y. Vardi

Rice University, Houston, TX, USA

Gerhard Weikum

Max-Planck Institute of Computer Science, Saarbruecken, Germany

Maurizio Gabbrielli Gopal Gupta (Eds.)

Logic Programming

21st International Conference, ICLP 2005
Sitges, Spain, October 2-5, 2005
Proceedings

Volume Editors

Maurizio Gabbielli
Università di Bologna
Dipartimento di Scienze dell'Informazione
Mura Anteo Zamboni 7, 40127 Bologna, Italy
E-mail: gabbri@cs.unibo.it

Gopal Gupta
University of Texas at Dallas
Department of Computer Science
Richardson, TX 75083-0688, USA
E-mail: gupta@utdallas.edu

Library of Congress Control Number: 2005932757

CR Subject Classification (1998): D.1.6, I.2.3, D.3, F.3, F.4

ISSN 0302-9743
ISBN-10 3-540-29208-X Springer Berlin Heidelberg New York
ISBN-13 978-3-540-29208-1 Springer Berlin Heidelberg New York

This work is subject to copyright. All rights are reserved, whether the whole or part of the material is concerned, specifically the rights of translation, reprinting, re-use of illustrations, recitation, broadcasting, reproduction on microfilms or in any other way, and storage in data banks. Duplication of this publication or parts thereof is permitted only under the provisions of the German Copyright Law of September 9, 1965, in its current version, and permission for use must always be obtained from Springer. Violations are liable to prosecution under the German Copyright Law.

Springer is a part of Springer Science+Business Media

springeronline.com

© Springer-Verlag Berlin Heidelberg 2005
Printed in Germany

Typesetting: Camera-ready by author, data conversion by Scientific Publishing Services, Chennai, India
Printed on acid-free paper SPIN: 11562931 06/3142 5 4 3 2 1 0

Preface

This volume contains the proceedings of the 21st International Conference on Logic Programming which was held in Sitges (Barcelona), Spain, from October 2nd to 5th, 2005. The conference was colocated with the International Conference on Constraint Programming (CP 2005) and the following 6 post-conference workshops:

- CICLOPS 2005: Colloquium on Implementation of Constraint and Logic Programming Systems
- CSLP 2005: Constraint Solving and Language Processing
- WCB 2005: Constraint Based Methods for Bioinformatics
- WLPE 2005: Logic-Based Methods in Programming Environments
- MoVeLog 2005: Mobile Code Safety and Program Verification Using Computational Logic Tools
- CHR 2005: Constraint Handling Rules

The conference coincided with a solar eclipse, which occurred on October 3rd and was visible in Sitges. No conference activities were scheduled at the time of the eclipse to allow delegates to view this extraordinary astronomical event.

Since the first conference that was held in Marseilles in 1982, ICLP has been the premier international conference for presenting research in logic programming. In this edition of the conference, extra attention was given to novel applications of logic programming and to work providing novel integrations of different areas. Colocation with CP 2005 further reinforced these themes, as it provided an opportunity for the exchange of ideas and cross-fertilization among two areas which have common roots. ICLP 2005 and CP 2005 shared the invited speakers to underscore this effort. ICLP 2005 broke new ground by holding a doctoral consortium for the first time in the ICLP series of conference.

One hundred and four abstracts were submitted in response to the call for papers. All but a few abstracts were followed by the submission of a full paper 1 week later. Each full paper was reviewed by at least three referees and the Program Committee finally selected 25 contributed papers and 15 poster papers. In addition, the program included invited talks by Ian Horrocks, Francesca Rossi, and Peter Stuckey, an industrial invited talk by Walter Wilson, a tutorial by Vítor Santos Costa on “Inductive Logic Programming, Statistical Relational Learning, and Its Applications”, a panel on “Future Logic Programming Languages” and a doctoral consortium. The seven students selected for the doctoral consortium also presented their research as a poster in the program. The extended abstracts of the invited talks and of all the posters are also included in these proceedings.

ICLP 2005 was organized by the Association for Logic Programming (ALP), in collaboration with the Artificial Intelligence Research Institute of the Spanish Council for Scientific Research (IIA-CSIC) and the Technical University of

Catalonia (UPC). Other sponsors included the Asociación Española de Inteligencia Artificial (AEPIA), the University of Texas at Dallas (UTD), CoLogNET, the University of Lleida, the Spanish Ministry of Education and Science and Cambridge University Press.

There are many people who deserve thanks for contributing to the success of the conference as well as to the creation of this volume. The PC members, aided by several external referees, produced timely and accurate reviews for the large number of submitted papers. The conference co-chairs, Pedro Meseguer and Javier Larrosa, did a superb job in organizing the joint event, as well as in successfully solving the many problems that were encountered. Hai-Feng Guo, the workshop chair, Felip Manya, the publicity chair, and Enrico Pontelli, the doctoral consortium chair, significantly contributed to the conference's success through their untiring efforts. Thanks to Bart Demoen for having accepted to organize again the traditional Programming Contest. Finally, thanks to all the authors who took an interest in ICLP 2005 and submitted papers, and to the developers of the Easy Chair conference management system that made our job as program co-chairs so much easier.

July 2005

Maurizio Gabbrielli and Gopal Gupta

Organization

Organizing Committee

Conference Co-chairs	Pedro Meseguer (IIIA-CSIC, Spain) Javier Larrosa (Technical University of Catalonia, Spain)
Program Co-chairs	Maurizio Gabbielli (University of Bologna, Italy) Gopal Gupta (University of Texas at Dallas, USA)
Workshop Chair	Hai-Feng Guo (University of Nebraska at Omaha, USA)
Doctoral Consortium Chair	Enrico Pontelli (New Mexico State University, USA)
Publicity Chair	Felip Manya (IIIA-CSIC, Spain)

Program Committee

Roberto Bagnara (University of Parma, Italy)
Maurice Bruynooghe (KU Leuven, Belgium)
Stefan Decker (Digital Enterprise Research Institute, Ireland)
Giorgio Delzanno (University of Genoa, Italy)
Thom Fruehwirth (University of Ulm, Germany)
Maurizio Gabbielli (University of Bologna, Italy, Program Co-chair)
Gopal Gupta (University of Texas at Dallas, USA, Program Co-chair)
Patricia Hill (University of Leeds, UK)
Joxan Jaffar (University of Singapore, Singapore)
Bharat Jayaraman (SUNY Buffalo, USA)
Javier Larrosa (Technical University of Catalonia, Spain, Conference Co-chair)
Michael Leuschel (University of Dusseldorf, Germany)
Massimo Marchiori (University of Venice, Italy and W3C, MIT, USA)
Pedro Meseguer (IIIA-CSIC, Spain, Conference Co-chair)
Juan Moreno Navarro (Technical University of Madrid, Spain)
Gopalan Nadathur (University of Minnesota, USA)
Illka Niemela (Helsinki University of Technology, Finland)
Catuscia Palamidessi (INRIA, France)
Enrico Pontelli (New Mexico State University, USA)
I.V. Ramakrishnan (SUNY Stony Brook, USA)
Vitor Santos Costa (Federal University of Rio de Janeiro, Brazil)
Harald Sondergaard (University of Melbourne, Australia)
Peter Stuckey (University of Melbourne, Australia)
Frank Valencia (University of Uppsala, Sweden)

External Reviewers

Marco Alberti
Etienne Payet
James Bailey
Marcello Balduccini
Nicola Stokes
Maria Garcia de la Banda
Ajay Bansal
Peter Baumgartner
Ralph Becket
Marc Bezem
Paolo Bouquet
Andrea Bracciali
Sebastian Brand
Maarten Marien
Nguyen Manh Thang
Hou Ping
Rudradeb Mitra
Daniel Cabeza
Manuel Carro
Wei-Ngan Chin
Tom Clothia
Michael Codish
Alvaro Cortes-Calabuig
Vitor Santos Costa
Stephen-John Craig
Marc Denecker
Yuxin Deng
Juergen Dix
Jin-Song Dong
Phan Minh Dung
Amy Felty
Antonio Fernandez
Michel Ferreira
Andrzej Filinski
Mario Florido
Alan M. Frisch
Marco Gavanelli
Juergen Giesl
Cinzia Di Giusto
Roberta Gori
Haifeng Guo
Gopal Gupta
James Harland
Andreas Harth
Angel Herranz
Tomi Janhunen
Michael Kifer
Andy King
Herbert Kuchen
Narayan Kumar
Jorge Lobo
Ricardo Lopes
Ruediger Lunde
Michael Maher
Ajay Mallya
Maarten Marien
Julio Mario
Kim Marriott
Viviana Mascardi
Marc Meister
Maria Chiara Meo
Fred Mesnard
Dale Miller
Roberto Montagna
Saikat Mukherjee
Susana Muñoz Hernández
George Necula
Shiri Nematollaah
Paulo Oliva
Mauricio Osorio
Sascha Ossowski
Jorge Andres Perez
Andrea Pescetti
Alessandra di Pierro
Inna Pivkina
Axel Polleres
Enrico Pontelli
Luis Omar Quesada
C.R. Ramakrishnan
Christophe Rigotti
Ricardo Rocha
Abhik Roychoudhury
Fernando Silva
Kostis Sagonas
Diptikalyan Saha
Chiaki Sakama

Peter Schachte	V.N. Venkatakrishnan
Tom Schrijvers	Joost Vennekens
Luke Simon	Razvan Voicu
Jan-Georg Smaus	Mark Wallace
Zoltan Somogyi	Hui Wan
Tran Cao Son	Qian Wang
Fausto Spoto	David Warren
Martin Sulzmann	Herbert Wiklicky
Tommi Syrjanen	Limsoon Wong
Paolo Taccella	Eric Van Wyk
Ana Paula Tomas	Guizhen Yang
Francesca Toni	Roland Yap
Mauricio Varea	Enea Zaffanella

Table of Contents

OWL: A Description Logic Based Ontology Language <i>Ian Horrocks</i>	1
Preference Reasoning <i>Francesca Rossi</i>	5
The G12 Project: Mapping Solver Independent Models to Efficient Solutions <i>Peter J. Stuckey, Maria Garcia de la Banda, Michael Maher, Kim Marriott, John Slaney, Zoltan Somogyi, Mark Wallace, Toby Walsh</i>	9
Use of Logic Programming for Complex Business Rules <i>Walter G. Wilson</i>	14
A Generator of Efficient Abstract Machine Implementations and Its Application to Emulator Minimization <i>José F. Morales, Manuel Carro, Germán Puebla, Manuel V. Hermenegildo</i>	21
On the Relation Between Answer Set and SAT Procedures (or, Between CMODELS and SMODELS) <i>Enrico Giunchiglia, Marco Maratea</i>	37
Towards an Integration of Answer Set and Constraint Solving <i>S. Baselice, P.A. Bonatti, M. Gelfond</i>	52
A Comparison of CLP(FD) and ASP Solutions to NP-Complete Problems <i>Agostino Dovier, Andrea Formisano, Enrico Pontelli</i>	67
Guard and Continuation Optimization for Occurrence Representations of CHR <i>Jon Sneyers, Tom Schrijvers, Bart Demoen</i>	83
Coordination of Many Agents <i>Joxan Jaffar, Roland H.C. Yap, Kenny Q. Zhu</i>	98
Parallelizing Union-Find in Constraint Handling Rules Using Confluence Analysis <i>Thom Frühwirth</i>	113

XII Table of Contents

An Optimised Semantic Web Query Language Implementation in Prolog <i>Jan Wielemaker</i>	128
A Distributed and Probabilistic Concurrent Constraint Programming Language <i>Luca Bortolussi, Herbert Wiklicky</i>	143
HYPROLOG: A New Logic Programming Language with Assumptions and Abduction <i>Henning Christiansen, Veronica Dahl</i>	159
Abduction of Linear Arithmetic Constraints <i>Michael J. Maher</i>	174
Towards Implementations for Advanced Equivalence Checking in Answer-Set Programming <i>Hans Tompits, Stefan Woltran</i>	189
Hybrid Probabilistic Logic Programs with Non-monotonic Negation <i>Emad Saad, Enrico Pontelli</i>	204
Reducing Inductive Definitions to Propositional Satisfiability <i>Nikolay Pelov, Eugenia Ternovska</i>	221
Symbolic Support Graph: A Space Efficient Data Structure for Incremental Tabled Evaluation <i>Diptikalyan Saha, C.R. Ramakrishnan</i>	235
Dynamic Mixed-Strategy Evaluation of Tabled Logic Programs <i>Ricardo Rocha, Fernando Silva, Vitor Santos Costa</i>	250
Nondeterminism Analysis of Functional Logic Programs <i>Bernd Braßel, Michael Hanus</i>	265
Techniques for Scaling Up Analyses Based on Pre-interpretations <i>John P. Gallagher, Kim S. Henriksen, Gourinath Banda</i>	280
Deductive Multi-valued Model Checking <i>Ajay Mallya</i>	297
Polynomial Interpretations as a Basis for Termination Analysis of Logic Programs <i>Manh Thang Nguyen, Danny De Schreye</i>	311
Testing for Termination with Monotonicity Constraints <i>Michael Codish, Vitaly Lagoon, Peter J. Stuckey</i>	326

A Well-Founded Semantics with Disjunction <i>João Alcântara, Carlos Viegas Damásio, Luís Moniz Pereira</i>	341
Semantics of Framed Temporal Logic Programs <i>Zhenhua Duan, Xiaoxiao Yang, Maciej Koutny</i>	356
Practical Higher-Order Pattern Unification with On-the-Fly Raising <i>Gopalan Nadathur, Natalie Linnell</i>	371
Small Proof Witnesses for LF <i>Susmit Sarkar, Brigitte Pientka, Karl Crary</i>	387
A Type System for CHR <i>Emmanuel Coquery, François Fages</i>	402
Decision Support for Personalization on Mobile Devices <i>Thomas Kleemann, Alex Sinner</i>	404
A Generic Framework for the Analysis and Specialization of Logic Programs <i>Germán Puebla, Elvira Albert, Manuel Hermenegildo</i>	407
The Need for Ancestor Resolution When Answering Queries in Horn Clause Logic <i>Oliver Ray</i>	410
Modeling Systems in CLP <i>Joxan Jaffar, Andrew E. Santosa, Răzvan Voicu</i>	412
A Sufficient Condition for Strong Equivalence Under the Well-Founded Semantics <i>Christos Nomikos, Panos Rondogiannis, William W. Wadge</i>	414
IMPACT: Innovative Models for Prolog with Advanced Control and Tabling <i>Ricardo Rocha, Ricardo Lopes, Fernando Silva, Vítor Santos Costa</i>	416
Using CLP to Characterise Linguistic Lattice Boundaries in a Text Mining Process <i>Alexandre S. Saidi</i>	418
Hybridization of Genetic Algorithms and Constraint Propagation for the BACP <i>Tony Lambert, Carlos Castro, Eric Monfroy, María Cristina Riff, Frédéric Saubion</i>	421

XIV Table of Contents

The MYDDAS Project: Using a Deductive Database for Traffic Characterization <i>Michel Ferreira</i>	424
Open World Reasoning in Datalog <i>Gergely Lukácsy, Zsolt Nagy</i>	427
Optimizing Queries for Heterogeneous Information Sources <i>András G. Békés</i>	429
Denotational Semantics Using Horn Concurrent Transaction Logic <i>Marcus Vinicius Santos</i>	431
Gentra4cp: A Generic Trace Format for Constraint Programming <i>Ludovic Langevine, The French RNTL OADymPPaC Team</i>	433
Analyses, Optimizations and Extensions of Constraint Handling Rules: Ph.D. Summary <i>Tom Schrijvers</i>	435
Formalization and Verification of Interaction Protocols <i>Federico Chesani</i>	437
\mathcal{PS} -LTL for Constraint-Based Security Protocol Analysis <i>Ricardo Corin, Ari Saptawijaya, Sandro Etalle</i>	439
Concurrent Methodologies for Global Optimization <i>Luca Bortolussi</i>	441
A Temporal Programming Language for Heterogeneous Information Systems <i>Vitor Nogueira</i>	444
Nonmonotonic Logic Programs for the Semantic Web <i>Roman Schindlauer</i>	446
ICLP 2005 Doctoral Consortium – SiLCC Is Linear Concurrent Constraint Programming <i>Rémy Haemmerlé</i>	448
Analysis and Optimization of CHR Programs <i>Jon Sneyers</i>	450
Author Index	453