

Introduction to the 31st International Conference on Logic Programming special issue

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The 31st edition of the International Conference of Logic Programming (ICLP 2015) took place in Cork, Ireland, from 31 August 2015 to 4 September 2015, co-located with the 21st International Conference on Principles and Practice of Constraint Programming (CP 2015) and part of *George Boole 200*, a celebration of the life and work of George Boole who was born in 1815 and worked at the University College of Cork.

This special issue of Theory and Practice of Logic Programming (TPLP) consists of the regular papers accepted for presentation at ICLP 2015, as for all previous editions of the conference following a decision in 2010 by the Association for Logic Programming and Cambridge University Press. The papers appearing in this issue are classed as “TPLP rapid publications”.

We solicited papers in all areas of logic programming including but not restricted to:

- Theory: Semantic Foundations, Formalisms, Nonmonotonic Reasoning, Knowledge Representation;
- Implementation: Compilation, Virtual Machines, Parallelism, Constraint Handling Rules and Tabling;
- Environments: Program Analysis, Transformation, Validation, Verification, Debugging, Profiling, Testing;
- Language Issues: Concurrency, Objects, Coordination, Mobility, Modes, Types, Higher Order, Assertions, Programming Techniques;
- Related Paradigms: Inductive and Coinductive Logic Programming, Constraint Logic Programming, Answer-Set Programming, SAT, Constraints, Computational Argumentation, Abductive Logic Programming, Functional Logic Programming;

- Applications: Databases, Data Integration and Federation, Software Engineering, Natural Language Processing, Web and Semantic Web, Agents, Artificial Intelligence, Bioinformatics, Social Networks and Social Choice.

There were two categories for submissions:

- i) regular papers, including: (1) technical papers for describing technically sound, innovative ideas that can advance the state of logic programming; (2) application papers, with emphasis on impact on some application domains; (3) system and tool papers, with emphasis on novelty, practicality, usability and availability of the systems and tools described;
- ii) technical communications, aimed at describing recent developments, new projects, and other materials not ready for publication as regular papers.

All submissions were required to be written in English, to describe original, previously unpublished research, and not be simultaneously submitted for publication elsewhere.

We received 89 submissions of abstracts (88 regular papers, 1 technical communication) of which 74 resulted in submissions of papers. The program chairs, acting as guest editors of this special issue, organized the refereeing process with the help of the program committee and external reviewers. Each paper was reviewed by at least three anonymous referees who provided full written evaluations. Some papers were conditionally accepted as regular papers and were subject to a second round of reviewing. Finally, we accepted 21 of the submitted papers as regular papers, appearing in this special issue and listed below, and a further 25 as technical communications, of which 23 will be published in CEUR (2 were withdrawn). The abstracts of the 23 technical communications can be found in Appendix A of this editorial.

- Benoit Desouter, Marko van Dooren and Tom Schrijvers: *Tabling as a Library with Delimited Control*
- Sarah Alice Gaggl, Norbert Manthey, Alessandro Ronca, Johannes Peter Wallner and Stefan Woltran: *Improved Answer-Set Programming Encodings for Abstract Argumentation*
- Martin Gebser, Amelia Harrison, Roland Kaminski, Vladimir Lifschitz and Torsten Schaub: *Abstract Gringo*
- Bart Bogaerts and Guy Van den Broeck: *Knowledge Compilation of Logic Programs Using Approximation Fixpoint Theory*
- Craig Blackmore, Oliver Ray and Kerstin Eder: *A Logic Programming Approach to Predict Effective Compiler Settings for Embedded Software*
- Johannes Klaus Fichte, Miroslaw Truszczyński and Stefan Woltran: *Dual-normal Logic Programs - the Forgotten Class*
- Mark Law, Alessandra Russo and Krysia Broda: *Learning Weak Constraints in Answer Set Programming*
- Graeme Gange, Jorge A Navas, Peter Schachte, Harald Sondergaard and Peter J. Stuckey: *Horn Clauses as an Intermediate Representation for Program Analysis and Transformation*

- Neng-Fa Zhou, Roman Bartak and Agostino Dovier: *Planning as Tabled Logic Programming*
- Mario Alviano, Wolfgang Faber and Martin Gebser: *Rewriting Recursive Aggregates in Answer Set Programming: Back to Monotonicity*
- Mario Alviano and Nicola Leone: *Complexity and Compilation of GZ-Aggregates in Answer Set Programming*
- Mario Alviano and Rafael Peñaloza: *Fuzzy Answer Set Computation via Satisfiability Modulo Theories*
- Laura Koponen, Emilia Oikarinen, Tomi Janhunen and Laura Säilä: *Optimizing Phylogenetic Supertrees using Answer Set Programming*
- Felicidad Aguado, Pedro Cabalar, David Pearce, Gilberto Pérez and Concepción Vidal: *A Denotational Semantics for Equilibrium Logic*
- Emanuele De Angelis, Fabio Fioravanti, Alberto Pettorossi and Maurizio Proietti: *Proving Correctness of Imperative Programs by Linearizing Constrained Horn Clauses*
- Maximiliano Cristià, Gianfranco Rossi and Claudia Frydman: *Adding Partial Functions to Constraint Logic Programming with Sets*
- Pedro Cabalar, Martín Diéguez and Concepcion Vidal: *An Infinitary Encoding of Temporal Equilibrium Logic*
- Ingmar Dasseville, Matthias van der Hallen, Marc Denecker and Gerda Janssens: *Semantics of Templates in a Compositional Framework for Building Logics*
- Marco Manna, Francesco Ricca and Giorgio Terracina: *Taming Primary Key Violations to Query Large Inconsistent Data via ASP*
- Fred Mesnard, Étienne Payet and German Vidal: *Concolic Testing in Logic Programming*
- Nataliia Stulova, Jose F. Morales and Manuel V. Hermenegildo: *Practical Run-time Checking via Unobtrusive Property Caching*

The paper *Complexity and Compilation of GZ-Aggregates in Answer Set Programming*, by Mario Alviano and Nicola Leone, was awarded the ICLP 2015 Best Paper Prize.

In addition to the presentations of accepted papers, the technical program of ICLP 2015 included two panels, on

- *The Future Publication of ICLP Proceedings*, chaired by Torsten Schaub, and
- *Teaching Computer Science and Declarative Programming in Schools and Universities*, chaired by Manuel Hermenegildo,

as well as invited talks by Evelina Lamma (University of Ferrara, Italy), Luc De Raedt (Department of Computer Science, Katholieke Universiteit Leuven, Belgium), and Gerhard Friedrich (Institute of Applied Informatics, Universität Klagenfurt, Austria), joint speaker with CP 2015, and advanced tutorials by John Gallagher (Roskilde University, Denmark and IMDEA Software Institute, Spain), Francesca Lisi (Dipartimento di Informatica and Centro Interdipartimentale di Logica e Applicazioni, Università degli Studi di Bari “Aldo Moro”, Italy), Thomas Lukasiewicz (Department of Computer Science, University of Oxford, UK), and

Marco Maratea (Università degli Studi di Genova, Italy). These invited talks and tutorials are listed below.

- Evelina Lamma: *(Probabilistic) Description Logics*
- Luc De Raedt: *Using and Developing Declarative Languages for Machine Learning and Data Mining*
- Gerhard Friedrich: *Industrial Success Stories of ASP and CP: What's still open?*
- John Gallagher: *Tutorial on analysis and verification of imperative programs through CLP*
- Francesca Lisi: *A brief guided tour along the borders of Logic Programming with Description Logics*
- Thomas Lukasiewicz: *Datalog+/-: A New Family of Languages for Knowledge Representation and Reasoning*
- Marco Maratea: *Abstract Solvers for Answer Set Programming*

Moreover, the conference programme included several workshops and a Doctoral Consortium, where the following contributions were presented, whose abstracts are included in Appendix B of this editorial (the full contributions are also in the CEUR proceedings, alongside the technical communications).

- Günther Charwat: *Dynamic Programming on Tree Decompositions using Binary Decision Diagrams: Research Summary*
- Amelia Harrison: *Formal Methods for Answer Set Programming*
- Vincent Nys: *Advances in Analyzing Coroutines by Abstract Conjunctive Partial Deduction*
- Salim Perchy and Frank Valencia: *Opinions and Beliefs as Constraint System Operators*
- Amr Hany Saleh: *Transforming Delimited Control: Achieving Faster Effect Handlers*
- Matthias van der Hallen: *Higher Order Support in Logic Specification Languages for Data Mining Applications*
- Yi Wang: *Handling Probability and Inconsistency in Answer Set Programming*

The submission of Amelia Harrison was selected by the chairs of the Doctoral Consortium as the best DC submission this year.

As in previous editions of the conference, the program chairs handed out test of time awards to the most influential papers published 10 and 20 years before the conference at the ICLP and ILPS conferences. In the 20 years category, the following paper from ICLP/ILPS 1995 was selected to have withstood the test of time and to have had the largest impact:

- Taisuke Sato: *A Statistical Learning Method for Logic Programs with Distribution Semantics.*

In the 10 years category, the following papers from ICLP 2005 were selected as equally influential:

- Sabrina Baselice, Piero A. Bonatti, Michael Gelfond: *Towards an Integration of Answer Set and Constraint Solving*;
- Michael Codish, Vitaly Lagoon, Peter J. Stuckey: *Testing for Termination with Monotonicity Constraints*.

In conclusion, we would like to thank the members of the Program Committee and the external referees for their professionalism, enthusiasm, hard work, and promptness, despite the high load of the two rounds of refereeing. The Program Committee members were:

Slim Abdennadher, Elvira Albert, Chitta Baral, François Bry, Pedro Cabalar, Manuel Carro, Michael Codish, Stefania Costantini, Alessandro Dal Palù, Marina De Vos, Marc Denecker, Agostino Dovier, Thomas Eiter, Esra Erdem, Wolfgang Faber, François Fages, Michael Fink, Thom Fruehwirth, Sarah Alice Gaggl, Maria Garcia De La Banda, Laura Giordano, Gopal Gupta, Michael Hanus, Tomi Janhunen, Michael Kifer, Angelika Kimmig, Evelina Lamma, Joohyung Lee, Joao Leite, Michael Leuschel, Francesca Alessandra Lisi, Thomas Lukasiewicz, Michael Maher, Alessandra Mileo, Barry O'Sullivan, Emilia Oikarinen, Mauricio Osorio, Enrico Pontelli, Maurizio Proietti, Francesco Ricca, Alessandra Russo, Chiaki Sakama, Vítor Santos Costa, Torsten Schaub, Tom Schrijvers, Yi-Dong Shen, Guillermo R. Simari, Francesca Toni, Paolo Torroni, Irina Trubitsyna, Mirek Truszczyński, Kewen Wang, Jan Wielemaker, Stefan Woltran, Roland Yap, Jia-Huai You, Neng-Fa Zhou.

The external referees were: Hazem Abbas, Bernhard Bliem, Veronica Borja, Maurice Bruynooghe, Shaowei Cai, Tran Cao Son, Jose Luis Carballido, Juan Carlos Nieves, Ingmar Dasseville, Bart Demoen, Martín Diéguez, Carmine Dodaro, Gregory Duck, Sandra Dylus, Alia El Bolock, Mohamed Elmahdy, Jorge Fandiño, Johannes Klaus Fichte, Fabio Fioravanti, Ferdinando Fioretto, Daniel Gall, Feng Gao, Marco Gavanelli, Martin Gebser, Carmen Gervet, Rémy Haemmerlé, Joaquin Arias Herero, Roland Kaminski, Arash Karimi, Arun Konagurthu, Manos Koukoutos, Vitaly Lagoon, Pierre Lescanne, Fangfang Liu, Theofrastos Mantadelis, J. Raymundo Marcial-Romero, Alberto Martelli, Rob Miller, Jose F. Morales, Matthias Nickles, Philipp Obermeier, Max Ostrowski, Björn Peemöller, Alberto Pettorossi, Carla Piazza, Fabrizio Riguzzi, Enric Rodríguez Carbonell, C. R. Ramakrishnan, Emanuel Sallinger, João Santos, Lukas Schweizer, Nada Sharaf, Kostyantyn Shchekotykhin, Jaime Sánchez-Hernández, Jon Sneyers, Md Solimul Chowdhury, Martin Suda, Theresa Swift, Shahab Tasharofi, Daniele Theseider Dupré, Jan Rasmus Tikovsky, Matthias van der Hallen, Concepción Vidal, Antonius Weinzierl, Amira Zaki, Zhiqiang Zhuang.

We would also like to thank the full ICLP 2015 Organization, namely Barry O'Sullivan and Roland Yap (General Co-Chairs), Ken Brown and Barry O'Sullivan (Local Arrangements Co-Chairs), Mats Carlsson (Workshop Chair), Marina De Vos and Yuliya Lierler (Doctoral Consortium Co-Chairs), Neng-Fa Zhou, Peter Stuckey, and Antonius Weinzierl (LP/CP Programming Contest), and Ian Miguel (Publicity Chair).

Finally, we would also like to express our thanks and great appreciation to Mirek Truszczyński, Editor in Chief of Theory and Practice of Logic Programming, Emma Pearce from Cambridge University Press, and the members of the ALP Executive Committee, and in particular Manuel Carro as the ALP Conference Coordinator, for their continued support.

Thomas Eiter and Francesca Toni
Program Committee Chairs and Guest Editors

Supplementary material

The abstracts of the Technical Communications and the abstracts of the Doctoral Consortium contributions for this conference are available as supplementary material. To view supplementary material for this article, please visit <http://dx.doi.org/10.1017/S1471068415000356>.