

# *Introduction to the 32<sup>nd</sup> International Conference on Logic Programming Special Issue*

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The main track of the Thirty Second International Conference on Logic Programming (ICLP) took place in New York City, USA, from the 18<sup>th</sup> to the 21<sup>st</sup> October 2016. It seems fitting to hold a significant, power of two, ICLP in New York because the city has a long and distinguished association with logic programming: XSB was developed at Stony Brook, as was HiLog before that, and SB-Prolog before that. Moreover, Picat was developed at the City University of New York, as was B-Prolog, and other logic programming-based systems, such as Ergo. New York has also been (and is) the cradle of several start-ups based on logic programming.

This special issue of Theory and Practice of Logic Programming (TPLP) consists of regular papers accepted for presentation at ICLP'16. ICLP'16 adopts the publication model used in all recent editions of the conference, following a decision made in 2010 by the Association for Logic Programming and Cambridge University Press. All papers appearing in this issue are thus classified as “TPLP rapid publications”. We solicited papers in all areas of logic programming, including:

- Theory: Semantic Foundations, Formalisms, Non-monotonic Reasoning, Knowledge Representation.
- Implementation: Compilation, Virtual Machines, Parallelism, Constraint Handling Rules, Tabling.
- Environments: Program Analysis, Transformation, Validation, Verification, Debugging, Profiling, Testing.
- Language Issues: Concurrency, Objects, Coordination, Mobility, Higher Order, Types, Modes, Assertions, Programming Techniques.
- Related Paradigms: Inductive and Co-inductive Logic Programming, Constraint Logic Programming, Answer-Set Programming, SAT-Checking.
- Applications: Databases, Big Data, Data Integration and Federation, Software Engineering, Natural Language Processing, Web and Semantic Web, Agents, Artificial Intelligence, Bioinformatics, and Education.

We accepted three kinds of papers:

- Technical papers for technically sound, innovative ideas that can advance the state of logic programming;
- Application papers that impact interesting application domains;
- System and tool papers which emphasise novelty, practicality, usability, and availability of the systems and tools described.

We received 88 submissions of abstracts, of which 68 resulted in full submissions. The program chairs, acting as guest editors of the special issue, organised the refereeing process, which was undertaken by the programme committee with the support of external reviewers. Each paper was reviewed by at least three anonymous referees who provided detailed written evaluations. This enabled a list of papers to be short-listed as candidates for rapid communication. The authors of these papers revised their submissions in light of the reviewers' suggestions, and all these papers were subject to a second round of reviewing. Of these candidates papers, 27 were accepted as rapid communications, to appear in the special issue. In addition, the program committee recommended 15 papers to be accepted as technical communications (TCs), to be also presented at the conference. These TCs, together with the presentations from the Doctoral Consortium, were published by Dagstuhl Publishing in Volume 52 of their OpenAccess Series in Informatics (OASICs), available at <http://www.dagstuhl.de/oasics>. The 27 rapid communications that appear in this special issue are listed below, in alphabetical order of the first author:

- María Alpuente, Demis Ballis, Francisco Frechina and Julia Sapiña, *Assertion-based Analysis via Slicing with ABETS* (System Description);
- Mario Alviano and Carmine Dodaro, *Anytime Answer Set Optimization via Unsatisfiable Core Shrinking*;
- Manuel Bichler, Michael Morak and Stefan Woltran, *The Power of Non-Ground Rules in Answer Set Programming*;
- Bart Bogaerts, Tomi Janhunnen and Shahab Tasharrofi, *Stable-Unstable Semantics: Beyond NP with Normal Logic Programs*;
- Pedro Cabalar and Jorge Fandinno, *Justifications for Programs with Disjunctive and Causal-choice Rules*;
- Zhuo Chen, Kyle Marple, Elmer Salazar, Gopal Gupta and Lakshman Tamil, *A Physician Advisory System for Chronic Heart Failure Management Based on Knowledge Patterns*;
- Stefania Costantini and Andrea Formisano, *Query Answering in Resource-Based Answer Set Semantics*;
- Jo Devriendt, Bart Bogaerts, Maurice Bruynooghe and Marc Denecker, *On Local Domain Symmetry for Model Expansion*;
- Carmine Dodaro, Philip Gasteiger, Nicola Leone, Benjamin Musitsch, Francesco Ricca and Kostyantyn Shchekotykhin, *Combining Answer Set Programming and Domain Heuristics for Solving Hard Industrial Problems* (Application Paper);
- Jorge Fandinno, *Deriving Conclusions from Non-Monotonic Cause-Effect Relations*;

- Michael Frank and Michael Codish, *Logic Programming with Graph Automorphism: Integrating nauty with Prolog* (Tool Description);
- Tiantian Gao, Paul Fodor and Michael Kifer, *Paraconsistency and Word Puzzles*;
- Isabel García-Contreras, José F. Morales and Manuel V. Hermenegildo, *Semantic Code Browsing*;
- Laura Giordano and Daniele Theseider Dupré, *ASP for Minimal Entailment in a Rational Extension of SROEL*;
- Amelia Harrison and Yuliya Lierler, *First-Order Modular Logic Programs and their Conservative Extensions*;
- Amelia Harrison and Vladimir Lifschitz, *Stable Models for Infinitary Formulas with Extensional Atoms*;
- Amelia Harrison, Vladimir Lifschitz and Julian Michael, *Proving Infinitary Formulas*;
- Daniela Incezan, *CoreALMlib: An ALM Library Translated from the Component Library*;
- Nikos Katzouris, Alexander Artikis and Georgios Paliouras, *Online Learning of Event Definitions*;
- Mark Law, Alessandra Russo and Krysia Broda, *Iterative Learning of Answer Set Programs with Context-Dependent Examples*;
- Pedro Lopez-Garcia, Maximiliano Klemen, Umer Liqat and Manuel V. Hermenegildo, *A General Framework for Static Profiling of Parametric Resource Usage*;
- Christoph Redl, *The DLVHEX System for Knowledge Representation: Recent Advances* (System Description);
- Amr Hany Saleh and Tom Schrijvers, *Efficient Algebraic Effect Handlers for Prolog*;
- João Santos and Ricardo Rocha, *On the Implementation of an Or-Parallel Prolog System for Clusters of Multicores*;
- K. Tuncay Tekle and Yanhong A. Liu, *Precise Complexity Guarantees for Pointer Analysis via Datalog with Extensions*;
- Alexander Vandenbroucke, Maciej Piróg, Benoit Desouter and Tom Schrijvers, *Tabling with Sound Answer Subsumption*;
- Jan Wielemaker and Keri Harris, *Lock-free Atom Garbage Collection for Multi-Threaded Prolog*.

After consultation with the program committee, the paper *Anytime Answer Set Optimization via Unsatisfiable Core Shrinking* was awarded the ICLP'16 best paper prize, and the paper *First-Order Modular Logic Programs and their Conservative Extensions* was awarded the best student paper prize. In addition to the presentations of accepted papers, the technical programme of ICLP'16 included two invited talks:

- Arun Majumdar, *One Billion Dollars, Global Warming and Logic Programming*;
- Francesca Rossi, *Embedding Ethical Principles in Decision Support Systems: Can (Constraint) Logic Programming Play a Role?*

and two advanced tutorials:

- Michael Kifer, Theresa Swift and Benjamin Grosf, *Practical Knowledge Representation and Reasoning in Ergo*;
- Yuliya Lierler, *Relating Constraint Answer Set Programming and Satisfiability Modulo Theories*.

as well as two test-of-time presentations:

- Ilkka Niemelä and Patrik Simons, *Efficient Implementation of the Well-founded and Stable Model Semantics*, Joint International Conference and Symposium on Logic Programming, 289–303, 1996, MIT Press;
- Luke Simon, Ajay Mallya, Ajay Bansal and Gopal Gupta, *Coinductive Logic Programming*, International Conference on Logic Programming, 330–345, 2006, Volume 4079 of the series Lecture Notes in Computer Science, Springer-Verlag.

The best papers were selected by the programme committee from those submissions with the joint highest aggregate score, as assigned by the reviewers. Each member of the PC was awarded 6 marks that they could divide between these candidate papers. The best student paper was selected likewise. The test-of-time papers were ranked by using citations as a proxy for impact. Google Scholar was used for collecting citations; care was taken to remove self-citations and check for citations that were split between a conference paper and a follow-up journal paper. There were clear winners for both the ten and twenty year categories.

The conference technical programme was augmented by four pre-conference workshops, namely:

- *Workshop on Applications of Logic Programming (AppLP)*, organised by David Warren and Annie Liu;
- *Workshop on Answer Set Programming and Other Computing Paradigms (AS-POCP)*, organised by Bart Bogaerts and Amelia Harrison;
- *The Fifth Workshop on Logic and Search (LaSh)*, organised by David Mitchell, Shahab Tasharofi and Sima Jamali;
- *Logic Programming with Constraints for Language Processing (CSLP)*, organised by Henning Christiansen and Verónica Dahl.

The Autumn Summer School ran in parallel with these workshops, and was organised by John Gallagher and Germán Vidal. Four half-day seminars were given in the School:

- *Constraint Logic Programming*, by Roman Barták;
- *Language Processing through Logic Grammars and Constraints*, by Verónica Dahl;
- *Verification and Probabilistic Logic Programming*, by C. R. Ramakrishnan;
- *Answer Set Programming: Foundations and Applications*, by Torsten Schaub.

The already traditional *Doctoral Consortium* ran in parallel with the main conference, organised by Neda Saeedloei and Marina De Vos. We would like to thank

the organisers of these affiliated events for their contributions to the conference as a whole.

We are of course deeply indebted to 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 were:

Marcello Balduccini	Mutsunori Banbara	Roman Barták
Pedro Cabalar	Mats Carlsson	Manuel Carro
Michael Codish	Marina De Vos	Agostino Dovier
Gregory Duck	Esra Erdem	Wolfgang Faber
Thom Frühwirth	John Gallagher	Marco Gavanelli
Martin Gebser	Michael Hanus	Katsumi Inoue
Gerda Janssens	Andy King	Ekaterina
		Komendantskaya
Michael Leuschel	Vladimir Lifschitz	José F. Morales
Enrico Pontelli	Jörg Pührer	Ricardo Rocha
Zoltan Somogyi	Harald Søndergaard	Theresa Swift
Francesca Toni	Irina Trubitsyna	Mirek Truszczyński
Alicia Villanueva	Jan Wielemaker	Stefan Woltran
Fangkai Yang	Jia-Huai You	

The external reviewers were:

Shqiponja Ahmetaj	Marco Alberti	Dalal Alrajeh
Bernhard Blüm	Carl Friedrich Bolz	Davide Bresolin
Luciano Caroprese	Md Solimul Chowdhury	Oana Cocarascu
Giuseppe Cota	Kristijonas Čyras	Alessandro Dal Palù
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Jorge Fandiño	Johannes Klaus Fichte	Andrea Formisano
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Mayer Goldberg	Sergio Greco	Amelia Harrison
Laurent Janssens	Roland Kaminski	Benjamin Kaufmann
Angelika Kimmig	Sebastian Krings	Evelina Lamma
Emily Leblanc	Tingting Li	Morgan Magnin
Theofrastos Mantadelis	Yunsong Meng	Cristian Molinaro
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Peter Schachte	Nada Sharaf	Takehide Soh
Tran Cao Son	Nataliia Stulova	Sophie Tournet
Guy Van den Broeck	Matthias van der Hallen	Pedro Vasconcelos
Germán Vidal	Yisong Wang	Philipp Wanko
Antonius Weinzierl	Amira Zaki	Heng Zhang

We would also like to thank the full ICLP 2016 organisation committee, namely Michael Kifer and Neng-Fa Zhou, who acted as general chairs; Marcello Balduccini, who served as workshop chair; Peter Schüller, who acted as publicity chair; Marina De Vos and Neda Saeedloei, who jointly chaired the Doctoral Consortium; Paul Fodor, who organised the programming contest; and, finally, Joaquín Arias, who designed the web pages (and also raised the bar on ICLP logos).

Our gratitude must be extended to Torsten Schaub, who is serving in the role of President of the Association of Logic Programming, to all the members of the ALP Executive Committee and to Mirek Truszczyński, Editor-in-Chief of Theory and Practice of Logic Programming. Also to the staff at Cambridge University Press, especially Richard Horley and Samira Ceccarelli, and to the personnel at Schloss Dagstuhl – Leibniz Zentrum für Informatik, especially Marc Herbstritt, for their timely assistance. We would also like to thank Andrei Voronkov and his staff for the EasyChair system, which helped us coordinate submission, review, discussion, and notification.

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Manuel Carro Liñares and Andy King  
Program Committee Chairs and Guest Editors  
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