

Introduction to the 34-th international conference on logic programming special issue

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submitted 14 June 2018; accepted 14 June 2018

This special issue of Theory and Practice of Logic Programming (TLP) contains the regular papers accepted for presentation at the 34-th International Conference on Logic Programming (ICLP 2018), held in Oxford, United Kingdom, from July 14th to July 17th, 2018.

ICLP 2018 was part of the Federated Logic Conference 2018, (FLOC 2018), as the premier conference on *foundations and applications of logic programming*, including but not restricted to answer-set programming, non-monotonic reasoning, unification and constraints based logic languages, constraint handling rules, argumentation logics, deductive databases, description logics, inductive and co-inductive logic programming.

Papers were solicited on:

- **Foundations:** semantics, execution algorithms, formal models.
- **Implementation:** virtual machines, compilation, memory management, parallel execution, foreign interfaces.
- **Language Design:** inference engines, type systems, concurrency and distribution, modules, metaprogramming, relations to object-oriented and functional programming, logic-based domain-specific languages.
- **Software-Development Techniques:** declarative algorithms and data structures, design patterns, debugging, testing, profiling, execution visualization.
- **Transformation and Analysis:** assertions, type and mode inference, partial evaluation, abstract interpretation, program transformations.
- **Applications and Synergies:** interaction with SAT, SMT and CSP solvers, logic programming techniques for type inference and theorem proving, horn-clause analysis, knowledge representation, cognitive computing, artificial intelligence, natural language processing, information retrieval, web programming, education, computational life sciences, computational mathematics.

Three kinds of submissions were accepted:

- *Technical papers*, which include technically sound, innovative ideas that can advance the state of logic programming;

- *Application papers*, which describe interesting application domains;
- *System and tool papers*, which emphasize novelty, practicality, usability, and availability of the systems and tools.

In addition to the presentations of accepted papers, the technical program has included invited talks, the doctoral consortium, and several workshops.

ICLP implemented the hybrid publication model used in all recent editions of the conference, with journal papers and Technical Communications (TCs), following a decision made in 2010 by the Association for Logic Programming. Papers of the highest quality were selected to be published as rapid publications in this special issue of TPLP. The TCs comprise papers which the Program Committee (PC) judged of good quality but not yet of the standard required to be accepted and published in TPLP as well as dissertation project descriptions stemming from the Doctoral Program (DP) held with ICLP.

We have received 63 submissions of abstracts, of which 49 resulted in full submissions. The Program Chairs, acting as guest editors of the special issue, organized the refereeing process, which was undertaken by the PC with the support of external reviewers. Each paper was reviewed by at least three 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, 25 were accepted as rapid communications, to appear in the special issue. In addition, the PC recommended 15 papers to be accepted as TCs, of which 14 were also presented at the conference (1 was withdrawn). These TCs, together with the presentations from the Doctoral Consortium, were published by Dagstuhl Publishing in Volume 64 of their OpenAccess Series in Informatics (OASICs), available at <http://www.dagstuhl.de/oasics>. The 25 rapid communications that appear in this special issue are listed below, in alphabetical order of the first author:

- *Mario Alviano, Carmine Dodaro and Marco Maratea*. Shared aggregate sets in answer set programming
- *Mario Alviano, Carmine Dodaro, Matti Järvisalo, Marco Maratea and Alessandro Previti*. Cautious Reasoning in ASP via Minimal models and Unsatisfiable Cores
- *Joaquín Arias, Manuel Carro, Elmer Salazar, Kyle Marple and Gopal Gupta*. Constraint Answer Set Programming without Grounding
- *George Baryannis, Ilias Tachmazidis, Sotiris Batsakis, Grigoris Antoniou, Mario Alviano, Timos Sellis and Pei-Wei Tsai*. A Trajectory Calculus for Qualitative Spatial Reasoning Using Answer Set Programming
- *Angela Bonifati, Stefania Dumbrava and Emilio Jesús Gallego Arias*. Certified Graph View Maintenance with Regular Datalog
- *Pedro Cabalar, Jorge Fandiño, Luis Fariñas Del Cerro and David Pearce*. Functional ASP with Intensional Sets; Application to Gelfond-Zhang Aggregates
- *Pedro Cabalar, Roland Kaminski, Torsten Schaub and Anna Schuhmann*. Temporal Answer Set Programming on Finite Traces
- *Angelos Charalambidis, Panos Rondogiannis and Ioanna Symeonidou*. Approximation Fixpoint Theory and the Well-Founded Semantics of Higher-Order Logic Programs

- *Marc Dahlem, Anoop Bhagyanath and Klaus Schneider.* Optimal Scheduling for Exposed Datapath Architectures with Buffered Processing Units by ASP
- *Emanuele De Angelis, Fabio Fioravanti, Alberto Pettorossi and Maurizio Proietti.* Solving Horn Clauses on Inductive Data Types Without Induction
- *Gregory Duck, Joxan Jaffar and Roland Yap.* Shape Neutral Analysis of Graph-based Data-structures
- *František Farka, Ekaterina Komendantskaya and Kevin Hammond.* Proof-relevant Horn Clauses for Dependent Type Inference and Term Synthesis
- *Martin Gebser, Van Nguyen, Philipp Obermeier, Thomas Otto, Orkunt Sabuncu, Torsten Schaub and Tran Cao Son.* Experimenting with robotic intra-logistics domains
- *Martin Gebser, Philipp Obermeier, Michel Ratsch-Heitmann, Mario Runge and Torsten Schaub.* Routing Driverless Transport Vehicles in Car Assembly with Answer Set Programming
- *Daniela Incezan, Qinglin Zhang, Marcello Balduccini and Ankush Israney.* An ASP Methodology for Understanding Narratives about Stereotypical Activities
- *Bishoksan Kafle, John Gallagher, Graeme Gange, Peter Schachte, Harald Søndergaard and Peter J. Stuckey.* An iterative approach to precondition inference using constrained Horn clauses
- *Tobias Kaminski, Thomas Eiter and Katsumi Inoue.* Exploiting Answer Set Programming with External Sources for Meta-Interpretive Learning
- *Joohyung Lee and Zhun Yang.* Translating LPOD and CR-Prolog2 into Standard Answer Set Programs
- *Joohyung Lee and Yi Wang.* A Probabilistic Extension of Action Language BC+
- *Arindam Mitra and Chitta Baral.* Incremental and Iterative Learning of Answer Set Programs from Mutually Distinct Examples
- *Arun Nampally, Timothy Zhang and Cartic R. Ramakrishnan.* Constraint-Based Inference in Probabilistic Logic Programs
- *Thanh Nguyen, Enrico Pontelli and Tran Cao Son.* Phylotastic: An Experiment in Creating, Manipulating, and Evolving Phylogenetic Biology Workflows Using Logic Programming
- *Aleksy Schubert and Paweł Urzyczyn.* First-order Answer Set Programming as Constructive Proof Search
- *Rolf Schwitter.* Specifying and Verbalising Answer Set Programs in Controlled Natural Language
- *David Scott Warren.* Top-down and Bottom-up Evaluation Reconciled

After consultation with the PC, the paper *Exploiting Answer Set Programming with External Sources for Meta-Interpretive Learning* by Tobias Kaminski, Thomas Eiter and Katsumi Inoue was awarded the best paper prize. The best paper was selected by the PC from those submissions with the joint highest aggregate score, as assigned by the reviewers. Each member of the PC was awarded 2 marks that they could divide between these candidate papers. In addition to the presentations of accepted papers, the technical program of ICLP 2018 included two invited talks:

- *Elvira Albert.* Avoiding redundancies in the exploration of concurrent programs
- *Thomas Eiter.* Answer Set Programs go 30: Past and Future

The conference technical program was augmented by two Test-of-Time papers, the Doctoral Program, organized by Paul Fodor and Neda Saeedloei, and by several workshops. The Test-of-Time papers were ranked by using citations as a proxy for impact. The web portals Scopus, Web of Science, Semantic Scholar and Google Scholar were 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.

We would like to thank the organizers of these affiliated events for their contributions to the conference as a whole. We are also deeply indebted to the Program Committee members and external reviewers, as the conference would not have been possible without their dedicated, enthusiastic and outstanding work. The Program Committee members were:

Mario Alviano	Hassan Aït-Kaci	Marcello Balduccini
Mutsunori Banbara	Pedro Cabalar	Mats Carlsson
Manuel Carro	Michael Codish	Alessandro Dal Palù
Marina De Vos	Thomas Eiter	Esra Erdem
Thom Frühwirth	Marco Gavanelli	Martin Gebser
Gopal Gupta	Michael Hanus	Amelia Harrison
Manuel Hermenegildo	Tomi Janhunnen	Angelika Kimmig
Ekaterina Komendantskaya	Nicola Leone	Michael Leuschel
Yuliya Lierler	Vladimir Lifschitz	Barry O'Sullivan
David Pearce	Enrico Pontelli	Ricardo Rocha
Chiaki Sakama	Vitor Santos Costa	Tom Schrijvers
Tran Cao Son	Theresa Swift	Peter Szeredi
Mirek Truszczyński	German Vidal	Jan Wielemaker
Stefan Woltran	Roland Yap	Jia-Huai You
Neng-Fa Zhou		

The external reviewers were:

Weronika T. Adrian	Sandra Alves	Joaquín Arias
João Barbosa	Zhuo Chen	Md Solimul Chowdhury
Carmine Dodaro	Gregory Duck	Wolfgang Faber
František Farka	Mário Florido	Michael Frank
Daniel Gall	Gregory Gelfond	Jurriaan Hage
Markus Hecher	Arash Karimi	Emily Leblanc
Jan Maly	Fumio Mizoguchi	Eric Monfroy
Michael Morak	Falco Nogatz	Adrian Palacios
Javier Romero	Elmer Salazar	Zeynep Saribatur
Sebastian Schellhorn	Peter Schüller	Farhad Shakerin
Nada Sharaf	Jon Sneyers	Finn Teegen
Pedro Vasconcelos	Alicia Villanueva	Yisong Wang
Philipp Wanko	Fangkai Yang	

We would also like to express our gratitude to the full ICLP 2018 organization committee, namely Marco Gavanelli who acted as general chairs; Enrico Pontelli, who served as workshop chair; Enrico Pontelli, who acted as publicity chair and designed the web pages; Paul Fodor and Neda Saeedloei, who jointly chaired the Doctoral Program of ICLP; and

Paul Fodor, who organized the programming contest. Our gratitude must be extended to Torsten Schaub, who is serving in the role of President of the Association of Logic Programming (ALP), to all the members of the ALP Executive Committee and to Mirek Truszczyński, Editor-in-Chief of TPLP. Also, to the staff at Cambridge University Press, especially Richard Horley, and to the personnel at Schloss Dagstuhl-Leibniz Zentrum für Informatik, especially Michael Wagner, for their assistance. We would also like to thank the staff of the EasyChair conference management system for helping the Program Chairs with their prompt support. We wish to thank each author of every submitted papers, since their efforts keep the conference alive and the participants to ICLP for bringing and sharing their ideas and latest developments.

Finally, we would like to thank to the FLOC 2018 conference general chair: Moshe Y. Vardi and to the FLOC 2018 co-chairs Daniel Kroening and Marta Kwiatkowska for their help and guidance to make ICLP part of this outstanding scientific event.