Introduction to the 38th International Conference on Logic Programming Special Issue

YULIYA LIERLER
University of Nebraska Omaha, Omaha, NE 68182, USA
(*e-mail:* ylierler@unomaha.edu)

JOSE F. MORALES
Universidad Politécnica de Madrid and IMDEA Software Institute, Madrid, Spain
(*e-mails:* josefrancisco.morales@upm.es, josef.morales@imdea.org)

This issue and its companion, the following one in this volume, contain the regular papers of the 38th International Conference on Logic Programming (ICLP 2022), held in Haifa, Israel, from July 31 to August 6, 2022. In 2022, ICLP was a part of the Federal Logic Conference (FLoC) 2022 (https://floc2022.org/).

Since the first conference held in Marseille in 1982, ICLP has been the premier international event for presenting research in logic programming. The scope of the conference covers all areas of logic programming including:

Foundations: semantics, formalisms, nonmonotonic reasoning, knowledge representation.

Languages issues: concurrency, objects, coordination, mobility, higher order, types, modes, assertions, modules, meta-programming, logic-based domain-specific languages, programming techniques.

Programming support: program analysis, transformation, validation, verification, debugging, profiling, testing, execution visualization.

Implementation: compilation, virtual machines, memory management, parallel/distributed execution, constraint handling rules, tabling, foreign interfaces, user interfaces.

Related Paradigms and Synergies: inductive and coinductive logic programming, constraint logic programming, answer set programming, interaction with SAT, SMT and CSP solvers, theorem proving, argumentation, probabilistic programming, machine learning.

Applications: databases, big data, data integration and federation, software engineering, natural language processing, web and semantic web, agents, artificial intelligence, computational life sciences, cybersecurity, robotics, education.

Besides the main track, ICLP 2022 included the following additional tracks:

- **Applications Track:** This track invited submissions of papers on emerging and deployed applications of LP, describing all aspects of the development, deployment, and evaluation of logic programming systems to solve real-world problems, including interesting case studies and benchmarks, and discussing lessons learned.

- **Recently Published Research Track:** This track provided a forum to discuss important results related to logic programming that appeared recently (from January 2020 onwards) in selective journals and conferences, but have not been previously presented at ICLP.

The organizers of ICLP 2022 were:

General Chairs

Michael Codish, Ben-Gurion University of the Negev, Israel

Program Chairs

Yuliya Lierler, University of Nebraska Omaha, USA

Jose F. Morales, Universidad Politécnica de Madrid and IMDEA Software Institute, Spain

Publicity Chair

Victor Perez, Universidad Politécnica de Madrid and IMDEA Software Institute, Spain

Recently Published Research Track Chairs

Martin Gebser, Alpen-Adria-Universität Klagenfurt, Austria

Tuncay Tekle, Stony Brook University, USA

Programming Contest Chairs

Mario Alviano, University of Calabria, Italy

Vitaly Lagoon, Cadence Design Systems, USA

10-year/20-year Test-of-Time Award Chairs

Esra Erdem, Sabanci University, Turkey

Paul Tarau, University of North Texas, USA

Doctoral Consortium Chairs

Veronica Dahl, Simon Fraser University, Canada

Carmine Dodaro University of Calabria, Italy

Workshops Coordinator

Daniela Inclezan, Miami University, USA

Three kinds of submissions were accepted:

- 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 emphasize novelty, practicality, usability, and availability of the systems and tools described.

ICLP adopted 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 extended abstracts from the different tracks and dissertation project descriptions stemming from the Doctoral Consortium Program (DP) held with ICLP.

We have received 68 submissions of abstracts, of which thirty six resulted in paper submissions and twenty four in extended abstract submissions, distributed as follows: ICLP main track (twenty seven papers), Applications track (nine full papers and one short paper), Recently Published Research track (twenty four extended abstracts). The Program Chairs organized the refereeing process that involved the program committee and several external reviewers. Each technical paper was reviewed by at least three referees who provided detailed written evaluations. This yielded submissions 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, 16 were accepted to appear for publication in Theory and Practice of Logic Programming as rapid communications. In addition, the Program Committee recommended 12 papers to be accepted as technical communications, to appear at Electronic Proceedings in Theoretical Computer Science (EPTCS) either as full papers or extended abstracts, of which 10 were also presented at the conference (two were withdrawn). Twenty four extended abstracts from Recently Published Research track were accepted to appear at EPTCS, of which 10 were also presented at the conference

The 16 papers selected for publication in Theory and Practice of Logic Programming appear in two issues of the journal, each containing eight papers. This issue contains the following papers.

Papers from the Main Track.

- *Rafael Kiesel, Pietro Totis, Angelika Kimmig*. Efficient Knowledge Compilation Beyond Weighted Model Counting. (Best Student Paper Award)
- *Linde Vanbesien, Maurice Bruynooghe, Marc Denecker*. Analyzing Semantics of Aggregate Answer Set Programming Using Approximation Fixpoint Theory.
- *Michael Hanus*. From Logic to Functional Logic Programs.
- *Emanuele De Angelis, Fabio Fioravanti, Alberto Pettorossi, Maurizio Proietti*. Verifying Catamorphism-Based Contracts using Constrained Horn Clauses.
- *Vladimir Lifschitz*. Strong Equivalence of Logic Programs with Counting.
- *Laura Giordano, Daniele Theseider Dupré*. An ASP approach for reasoning on neural networks under a finitely many-valued semantics for weighted conditional knowledge bases.
- *Alice Tarzariol, Martin Gebser, Mark Law, Konstantin Schekotihin*. Efficient lifting of symmetry breaking constraints for complex combinatorial problems. (Best Student Paper Award)
- *Mohammed M. S. El-Kholany, Martin Gebser, Konstantin Schekotihin*. Problem Decomposition and Multi-shot ASP Solving for Job-shop Scheduling.

The subsequent issue contains the following papers.

Papers from the Main Track.

- *Marynissen Simon, Heyninck Jesse, Bogaerts Bart, Denecker Marc*. On Nested Justification Systems.
- *Huaduo Wang, Farhad Shakerin, Gopal Gupta*. FOLD-RM: A Scalable, Efficient, and Explainable Inductive Learning Algorithm for Multi-Category Classification of Mixed Data.

- *Matthias Lanzinger, Stefano Sferrazza, Georg Gottlob.* MV-Datalog+-: Effective Rule-based Reasoning with Uncertain Observations. (Best Paper Award)
- *Paul Tarau.* Abductive Reasoning in Intuitionistic Propositional Logic via Theorem Synthesis.
- *Angelos Charalambidis, Christos Nomikos, Panos Rondogiannis.* Strong Equivalence of Logic Programs with Ordered Disjunction: a Logical Perspective.

Papers from the Application Track.

- *Joaquín Arias, Seppo Törmä, Manuel Carro, Gopal Gupta.* Building Information Modeling Using Constraint Logic Programming.
- *Thomas Eiter, Nelson Higuera, Johannes Oetsch, Michael Pritz.* A Neuro-Symbolic ASP Pipeline for Visual Question Answering.
- *David Gelessus, Michael Leuschel.* Making ProB compatible with SWI-Prolog. (Best Application Paper Award)

In addition to the presentations of accepted papers, the technical program of ICLP 2022 included three invited talks for the Main Track:

- *Fabrizio Riguzzi.* Probabilistic Logic Programming: Semantics, Inference and Learning
- *Theresa Swift.* Two Languages, One System: Tightly Connecting XSB Prolog and Python
- *Manuel Hermenegildo.* 50th anniversary of the birth of Prolog: Some reflections on Prolog's Evolution, Status, and Future

Furthermore, after a thorough examination of citation indices (e.g. Web of Science, Google Scholar), two test-of-time awards were identified by the 10-year/20-year Test-of-Time Award Chairs:

- The John Alan Robinson 20 year test-of-time award: *François Bry and Sebastian Schaffert.* Towards a declarative query and transformation language for XML and semistructured data: Simulation unification. LNCS n. 2401 pp. 255–270, Springer 2002.
- The Alain Colmerauer 10 year test-of-time award: *Max Ostrowski and Torsten Schaub.* ASP modulo CSP: The Clingcon system. Theory and Practice of Logic Programming, 12: 485–503, ICLP 2012.

We are 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 of ICLP 2022 were:

Salvador Abreu, Universidade de Évora, Portugal
Mario Alviano, University of Calabria, Italy
Marcello Balduccini, Saint Joseph's University, USA
Mutsunori Banbara, Nagoya University, Japan
Alex Brik, Google Inc., USA
François Bry, Ludwig Maximilian University of Munich, Germany
Pedro Cabalar, University of Corunna, Spain
Francesco Calimeri, University of Calabria, Italy

Manuel Carro, Technical University of Madrid and IMDEA, Spain
Angelos Charalambidis, University of Athens, Greece
Michael Codish, Ben-Gurion University of the Negev, Israel
Stefania Costantini, University of L'Aquila, Italy
Marc Denecker, KU Leuven, Belgi
Marina De Vos, University of Bath, UK
Agostino Dovier, University of Udine, Italy
Inês Dutra, University of Porto, Portugal
Thomas Eiter, Vienna University of Technology, Austria
Esra Erdem, Sabanci University, Turkey
Wolfgang Faber, Alpen-Adria-Universität Klagenfurt, Austria
Jorge Fandinno, University of Nebraska Omaha, USA
Paul Fodor, Stony Brook University, USA
Andrea Formisano, University of Udine, Italy
Gerhard Friedrich, Alpen-Adria-Universitaet Klagenfurt, Austria
Sarah Alice Gaggl, Technische Universität Dresden, Germany
Marco Gavanelli, University of Ferrara, Italy
Martin Gebser, Alpen-Adria-Universität Klagenfurt, Austria
Michael Gelfond, Texas Tech University, USA
Laura Giordano, Università del Piemonte Orientale, Italy
Gopal Gupta, University of Texas, USA
Michael Hanus, CAU Kiel, Germany
Manuel Hermenegildo, IMDEA and Universidad Politécnica de Madrid, Spain
Giovambattista Ianni, University of Calabria, Italy
Katsumi Inoue, National Institute of Informatics, Japan
Tomi Janhunen, Tampere University, Finland
Matti Järvisalo, University of Helsinkia, Finland
Jianmin Ji, University of Science and Technology of China
Nikos Katzouris, NCSR Demokritos
Zeynep Kiziltan, University of Bologna, Italy
Michael Kifer, Stony Brook University, USA
Ekaterina Komendantskaya, Heriot-Watt University, UK
Nicola Leone, University of Calabria, Italy
Michael Leuschel, University of Dusseldorf, Germany
Y. Annie Liu, Stony Brook University, USA
Vladimir Lifschitz, University of Texas, USA
Jorge Lobo, Pompeu Fabra University, Barcelona, Spain
Marco Maratea, University of Genova, Italy
Viviana Mascardi, University of Genova, Italy
Alessandra Mileo, Dublin City University, INSIGHT Centre for Data Analytics, Ireland
Manuel Ojeda-Aciego, University of Malaga, Spain
Enrico Pontelli, New Mexico State University, USA
Francesco Ricca, University of Calabria, Italy
Orkunt Sabuncu, TED University, Turkey
Chiaki Sakama, Wakayama University, Japan
Vitor Santos Costa, University of Porto, Portugal

Torsten Schaub, University of Potsdam, Germany
Konstantin Schekotihin, Alpen-Adria-Universität Klagenfurt, Austria
Tom Schrijvers, KU Leuven, Belgium
Mohan Sridharan, University of Birmingham, UK
Tran Cao Son, New Mexico State University, USA
Theresa Swift, Universidade Nova de Lisboa, Portugal
Paul Tarau, University of North Texas, USA
Tuncay Tekle, Stony Brook University, USA
Daniele Theseider Dupré, University of Piemonte Orientale, Italy
Mirek Truszczynski, University of Kentucky, USA
Joost Vennekens, KU Leuven, Belgium
German Vidal, Universitat Politècnica de València, Spain
Alicia Villanueva, VRAIN – Universitat Politècnica de València, Spain
Antonius Weinzierl, Vienna University of Technology, Austria
Kewen Wang, Griffith University, Australia
David Warren, SUNY Stony Brook, USA
Jan Wielemaker, VU University of Amsterdam, Netherlands
Stefan Woltran, Vienna University of Technology, Austria
Roland Yap, National University of Singapore, Republic of Singapore
Fangkai Yang, NVIDIA, USA
Jia-Huai You, University of Alberta, Canada
Yuanlin Zhang, Texas Tech University, USA
Zhizheng Zhang, Southeast University, China
Neng-Fa Zhou, CUNY Brooklyn College and Graduate Center, USA

The external reviewers were:

Martin Diller	Selin Eyupoglu	Giovanni Amendola
Michael Bernreiter	Carmine Dodaro	Linde Vanbesien
Arvid Becker	Aysu Bogatarkan	