

2015 30th Annual ACM/IEEE Symposium on Logic in Computer Science

(LICS 2015)

**Kyoto, Japan
6-10 July 2015**



**IEEE Catalog Number: CFP15039-POD
ISBN: 978-1-4799-8847-1**

2015 30th Annual ACM/IEEE Symposium on Logic in Computer Science

LICS 2015

Table of Contents

Foreword.....	.xi
Conference Organization.....	.xiii
Citation for the Test-of-Time Award from LICS 1995.....	.xv
External Reviewersxvi

Invited Talks

Higher-Order Model Checking: An Overview	1
<i>Luke Ong</i>	
Privacy and the Price of Data	16
<i>Daniel Kifer</i>	
From Categorical Logic to Facebook Engineering	17
<i>Peter O'Hearn</i>	

Invited Tutorials

Names and Symmetry in Computer Science (Invited Tutorial)	21
<i>Andrew M. Pitts</i>	
Recent Developments in Quantitative Information Flow (Invited Tutorial)	23
<i>Geoffrey Smith</i>	

Session 1: Petri Nets

Reachability in Two-Dimensional Vector Addition Systems with States Is PSPACE-Complete	32
<i>Michael Blondin, Alain Finkel, Stefan Göller, Christoph Haase, and Pierre McKenzie</i>	
Long-Run Average Behaviour of Probabilistic Vector Addition Systems	44
<i>Tomáš Brázdil, Stefan Kiefer, Antonín Kucera, and Petr Novotný</i>	

Demystifying Reachability in Vector Addition Systems	56
<i>Jérôme Leroux and Sylvain Schmitz</i>	
Petri Automata for Kleene Allegories	68
<i>Paul Brunet and Damien Pous</i>	
Complexity Bounds for Sum-Product Logic via Additive Proof Nets and Petri Nets	80
<i>Willem Heijltjes and Dominic J.D. Hughes</i>	

Session 2: Foundations of Programming Languages

A Cubical Approach to Synthetic Homotopy Theory	92
<i>Daniel R. Licata and Guillaume Brunerie</i>	
Game Semantics for Type Soundness	104
<i>Tim Disney and Cormac Flanagan</i>	
Programs for Cheap!	115
<i>Jennifer Hackett and Graham Hutton</i>	
Polarised Intermediate Representation of Lambda Calculus with Sums	127
<i>Guillaume Munch-Maccagnoni and Gabriel Scherer</i>	
On the Relative Usefulness of Fireballs	141
<i>Beniamino Accattoli and Claudio Sacerdoti Coen</i>	

Session 3: Bisimilarity

Bisimilarity in Fresh-Register Automata	156
<i>Andrzej S. Murawski, Steven J. Ramsay, and Nikos Tzevelekos</i>	
Branching Bisimilarity of Normed BPA Processes Is in NEXPTIME	168
<i>Wojciech Czerwiński and Petr Jancar</i>	
Branching Bisimilarity on Normed BPA Is EXPTIME-Complete	180
<i>Chaodong He and Mingzhang Huang</i>	

Session 4: Formal Languages

Distributed Graph Automata	192
<i>Fabian Reiter</i>	
Separating Regular Languages with Two Quantifiers Alternations	202
<i>Thomas Place</i>	
Star Height via Games	214
<i>Mikolaj Bojanczyk</i>	

Session 5: Game Graphs and Game Semantics

Nondeterminism in Game Semantics via Sheaves	220
<i>Takeshi Tsukada and C.H. Luke Ong</i>	
The Parallel Intensionally Fully Abstract Games Model of PCF	232
<i>Simon Castellan, Pierre Clairambault, and Glynn Winskel</i>	
Unifying Two Views on Multiple Mean-Payoff Objectives in Markov Decision Processes	244
<i>Krishnendu Chatterjee, Zuzana Komárková, and Jan Kretínský</i>	
Multidimensional beyond Worst-Case and Almost-Sure Problems for Mean-Payoff Objectives	257
<i>Lorenzo Clemente and Jean-François Raskin</i>	
Improved Algorithms for One-Pair and k-Pair Streett Objectives	269
<i>Krishnendu Chatterjee, Monika Henzinger, and Veronika Loitzenbauer</i>	

Session 6: Databases

The Hunt for a Red Spider: Conjunctive Query Determinacy Is Undecidable	281
<i>Tomasz Gogacz and Jerzy Marcinkowski</i>	
The Complexity of Boundedness for Guarded Logics	293
<i>Michael Benedikt, Balder Ten Cate, Thomas Colcombet, and Michael Vanden Boom</i>	
Finite Open-World Query Answering with Number Restrictions	305
<i>Antoine Amarilli and Michael Benedikt</i>	
Tree-like Queries in OWL 2 QL: Succinctness and Complexity Results	317
<i>Meghyn Bienvenu, Stanislav Kikot, and Vladimir Podolskii</i>	
Path Logics for Querying Graphs: Combining Expressiveness and Efficiency	329
<i>Diego Figueira and Leonid Libkin</i>	

Session 7: Modal and Second-Order Logic

PDL Is the Bisimulation-Invariant Fragment of Weak Chain Logic	341
<i>Facundo Carreiro</i>	
Monadic Second-Order Logic and Bisimulation Invariance for Coalgebras	353
<i>Sebastian Enqvist, Fatemeh Seifan, and Yde Venema</i>	
Defining Winning Strategies in Fixed-Point Logic	366
<i>Felix Canavoi, Erich Grädel, Simon Leßenich, and Wied Pakusa</i>	
Interpolation with Decidable Fixpoint Logics	378
<i>Michael Benedikt, Balder Ten Cate, and Michael Vanden Boom</i>	

A Complete Axiomatization of MSO on Infinite Trees	390
<i>Anupam Das and Colin Riba</i>	

Session 8: Category Theory and Domains

A Fibrational Account of Local States	402
<i>Kenji Maillard and Paul-André Melliès</i>	
Varieties of Languages in a Category	414
<i>Jirí Adámek, Robert S.R. Myers, Henning Urbat, and Stefan Milius</i>	
Extensions of Domain Maps in Differential and Integral Calculus	426
<i>Abbas Edalat</i>	
Descriptive Set Theory in the Category of Represented Spaces	438
<i>Arno Pauly and Matthew De Brecht</i>	
Domains of Commutative C-Subalgebras	450
<i>Chris Heunen and Bert Lindenhovius</i>	

Session 9: Constraints, Unification, and Knowledge Representation

From Complexity to Algebra and Back: Digraph Classes, Collapsibility, and the PGP	462
<i>Catarina Carvalho, Florent Madelaine, and Barnaby Martin</i>	
Locally Finite Constraint Satisfaction Problems	475
<i>Bartek Klin, Eryk Kopczynski, Joanna Ochremiak, and Szymon Torunczyk</i>	
Descriptive Complexity of List H-Coloring Problems in Logspace: A Refined Dichotomy	487
<i>Victor Dalmau, László Egri, Pavol Hell, Benoît Larose, and Arash Rafiey</i>	
One Context Unification Problems Solvable in Polynomial Time	499
<i>Adrià Gascón, Ashish Tiwari, and Manfred Schmidt Schaus</i>	
Extending ALCQIO with Trees	511
<i>Tomer Kotek, Mantas Šimkus, Helmut Veith, and Florian Zuleger</i>	

Session 10: Computability and Proofs

Feedback Turing Computability, and Turing Computability as Feedback	523
<i>Nathanael L. Ackerman, Cameron E. Freer, and Robert S. Lubarsky</i>	
Regularity Preserving but Not Reflecting Encodings	535
<i>Jörg Endrullis, Clemens Grabmayer, and Dimitri Hendriks</i>	
Hyper Natural Deduction	547
<i>Arnold Beckmann and Norbert Preining</i>	

Parallelism and Synchronization in an Infinitary Context	559
<i>Ugo Dal Lago, Claudia Faggian, Benoît Valiron, and Akira Yoshimizu</i>	
A Diagrammatic Axiomatisation for Qubit Entanglement	573
<i>Amar Hadzihasanovic</i>	

Session 11: Randomization and Probabilities

A Unifying Approach to the Gamma Question	585
<i>Benoit Monin and André Nies</i>	
Abstract Hidden Markov Models: A Monadic Account of Quantitative Information Flow	597
<i>Annabelle McIver, Carroll Morgan, and Tahiry Rabehaja</i>	
How Good Is a Strategy in a Game with Nature?	609
<i>Arnaud Carayol and Olivier Serre</i>	
Entailment among Probabilistic Implications	621
<i>Albert Atserias and José L. Balcázar</i>	
Metric Reasoning about λ -Terms: The Affine Case	633
<i>Raphaëlle Crubillé and Ugo Dal Lago</i>	

Session 12: Complexity

On the Complexity of Temporal Equilibrium Logic	645
<i>Laura Bozzelli and David Pearce</i>	
A Note on the Complexity of Classical and Intuitionistic Proofs	657
<i>Matthias Baaz, Alexander Leitsch, and Giselle Reis</i>	
On the Complexity of Linear Arithmetic with Divisibility	667
<i>Antonia Lechner, Joël Ouaknine, and James Worrell</i>	
Characterising Choiceless Polynomial Time with First-Order Interpretations	677
<i>Erich Grädel, Wied Pakusa, Svenja Schalthöfer, and Lukasz Kaiser</i>	
Universal Covers, Color Refinement, and Two-Variable Counting Logic: Lower Bounds for the Depth	689
<i>Andreas Krebs and Oleg Verbitsky</i>	

Session 13: Automata

A Canonical Form for Weighted Automata and Applications to Approximate Minimization	701
<i>Borja Balle, Prakash Panangaden, and Doina Precup</i>	
Automata-Based Abstraction Refinement for μ HORS Model Checking	713
<i>Naoki Kobayashi and Xin Li</i>	

Nested Weighted Automata	725
<i>Krishnendu Chatterjee, Thomas A. Henzinger, and Jan Otop</i>	
Timed Pushdown Automata Revisited	738
<i>Lorenzo Clemente and Slawomir Lasota</i>	
The Target Discounted-Sum Problem	750
<i>Udi Boker, Thomas A. Henzinger, and Jan Otop</i>	
Author Index	762