

Commenced Publication in 1973

Founding and Former Series Editors:

Gerhard Goos, Juris Hartmanis, and Jan van Leeuwen

Editorial Board

David Hutchison, UK

Josef Kittler, UK

Alfred Kobsa, USA

John C. Mitchell, USA

Oscar Nierstrasz, Switzerland

Bernhard Steffen, Germany

Demetri Terzopoulos, USA

Gerhard Weikum, Germany

Takeo Kanade, USA

Jon M. Kleinberg, USA

Friedemann Mattern, Switzerland

Moni Naor, Israel

C. Pandu Rangan, India

Madhu Sudan, USA

Doug Tygar, USA

FoLLI Publications on Logic, Language and Information Subline of Lectures Notes in Computer Science

Subline Editors-in-Chief

Valentin Goranko, *Technical University, Lyngby, Denmark*

Erich Grädel, *RWTH Aachen University, Germany*

Michael Moortgat, *Utrecht University, The Netherlands*

Subline Area Editors

Nick Bezhanishvili, *Imperial College London, UK*

Anuj Dawar, *University of Cambridge, UK*

Philippe de Groote, *Inria-Lorraine, Nancy, France*

Gerhard Jäger, *University of Tübingen, Germany*

Fenrong Liu, *Tsinghua University, Beijing, China*

Eric Pacuit, *Tilburg University, The Netherlands*

Ruy de Queiroz, *Universidade Federal de Pernambuco, Brazil*

Ram Ramanujam, *Institute of Mathematical Sciences, Chennai, India*

Luke Ong Ruy de Queiroz (Eds.)

Logic, Language, Information and Computation

19th International Workshop, WoLLIC 2012
Buenos Aires, Argentina, September 3-6, 2012
Proceedings



Springer

Volume Editors

Luke Ong
University of Oxford
Department of Computer Science
Wolfson Building, Parks Road
Oxford OX1 3QD, UK
E-mail: lo@cs.ox.ac.uk

Ruy de Queiroz
Universidade Federal de Pernambuco
Centro de Informática
Av. Jornalista Anibal Fernandes, s/n
50740-560 Recife, PE, Brazil
E-mail: ruy@cin.ufpe.br

ISSN 0302-9743 e-ISSN 1611-3349
ISBN 978-3-642-32620-2 e-ISBN 978-3-642-32621-9
DOI 10.1007/978-3-642-32621-9
Springer Heidelberg Dordrecht London New York

Library of Congress Control Number: 2012943843

CR Subject Classification (1998): F.4.1, F.2-4, I.2.3, G.2, E.1, I.1

LNCS Sublibrary: SL 1 – Theoretical Computer Science and General Issues

© Springer-Verlag Berlin Heidelberg 2012

This work is subject to copyright. All rights are reserved, whether the whole or part of the material is concerned, specifically the rights of translation, reprinting, re-use of illustrations, recitation, broadcasting, reproduction on microfilms or in any other way, and storage in data banks. Duplication of this publication or parts thereof is permitted only under the provisions of the German Copyright Law of September 9, 1965, in its current version, and permission for use must always be obtained from Springer. Violations are liable to prosecution under the German Copyright Law.

The use of general descriptive names, registered names, trademarks, etc. in this publication does not imply, even in the absence of a specific statement, that such names are exempt from the relevant protective laws and regulations and therefore free for general use.

Typesetting: Camera-ready by author, data conversion by Scientific Publishing Services, Chennai, India

Printed on acid-free paper

Springer is part of Springer Science+Business Media (www.springer.com)

Preface

This volume contains the papers of the 19th Workshop on Logic, Language, Information and Computation (WoLLIC 2012), which was held during September 3–6, 2012 at the University of Buenos Aires.

The WoLLIC series of workshops series started in 1994 with the aim of fostering interdisciplinary research in pure and applied logic. The idea is to have a forum which is large enough for dialogues between logic and the sciences relating to information and computation, and yet small enough for interactions among participants.

A total of 16 papers were accepted out of 46 submissions for presentation at WoLLIC 2012 and for inclusion in the proceedings. Each submitted paper was reviewed by at least three members of the Program Committee, who were assisted in their work by 62 external reviewers. We would like to thank the members of the Program Committee and the external reviewers for their review work, as well as Andrei Voronkov for providing the EasyChair system that proved invaluable throughout the review process and the preparation of this volume. In addition to the contributed papers, the WoLLIC program contained invited lectures by Andrea Asperti (Bologna), Hans van Ditmarsch (Sevilla), Laura Kallmeyer (Düsseldorf), George Metcalfe (Nashville), Anca Muscholl (Bordeaux), Andre Nies (Auckland), Peter Selinger (Halifax), and Nicole Schweikardt (Frankfurt).

Many people helped to make WoLLIC 2012 a success. We would like to thank Carlos Areces (Local Co-chair), Santiago Figueira (Local Co-chair), Javier Legris, and Anjolina G. de Oliveira; our sponsors: Departamento de Computación, Facultad de Ciencias Exactas y Naturales, Universidad de Buenos Aires and Facultad de Ciencias Económicas, Universidad de Buenos Aires, and Centro de Informática, Universidade Federal de Pernambuco, Brazil. Last, but not least, we gratefully acknowledge the sponsorship of the following organizations: Interest Group in Pure and Applied Logics (IGPL), Association for Logic, Language and Information (FoLLI), Association for Symbolic Logic (ASL), European Association for Theoretical Computer Science (EATCS), European Association for Computer Science Logic (EACSL), Sociedade Brasileira de Computação (SBC), and Sociedade Brasileira de Lógica (SBL).

June 2012

Luke Ong
Ruy de Queiroz

WoLLIC 2012 Conference Organization

Program Chair

Luke Ong University of Oxford, UK

Program Committee

Carlos Areces	Universidad Nacional de Córdoba, Argentina
Marcelo Arenas	Pontificia Universidad Católica, Chile
Steve Awodey	Carnegie Mellon University, USA
Verónica Becher	Universidad de Buenos Aires, Argentina
Patrick Blackburn	Roskilde University, Denmark
Maribel Fernandez	King's College London, UK
Santiago Figueira	Universidad Nacional de Córdoba, Argentina
Marcelo Finger	Universidade de Sao Paulo, Brazil
Marcelo Fiore	University of Cambridge, UK
Yuxi Fu	Shanghai Jiaotong University, China
Rosalie Iemhoff	Utrecht University, The Netherlands
Neil Immerman	University of Massachusetts, USA
Jean-Pierre Jouannaud	INRIA, France and Tsinghua University, China
Makoto Kanazawa	National Institute of Informatics, Japan
Delia Kesner	CNRS and Université Paris 7, France
Dexter Kozen	Cornell University, USA
Martin Lange	University of Kassel, Germany
Benedikt Löwe	Universiteit van Amsterdam, The Netherlands
Dag Normann	University of Oslo, Norway
Luke Ong	University of Oxford, UK
Erik Palmgren	Stockholm University, Sweden
Sylvain Salvati	INRIA, France
Philippe Schnoebelen	CNRS and ENS Cachan, France
Fernando Souza	Universidade Federal de Pernambuco, Brazil
Kazushige Terui	Kyoto University, Japan

Conference Co-chairs

Carlos Areces	Universidad Nacional de Córdoba, Argentina
Santiago Figueira	Universidad de Buenos Aires, Argentina

Organizing Committee

Carlos Areces	Universidad Nacional de Córdoba, Argentina
Santiago Figueira	Universidad de Buenos Aires, Argentina
Javier Legris	Universidad de Buenos Aires, Argentina
Anjolina G. de Oliveira	Universidade Federal de Pernambuco, Brazil
Ruy de Queiroz	Universidade Federal de Pernambuco, Brazil

WoLLIC Steering Committee Chair

Ruy de Queiroz	Universidade Federal de Pernambuco, Brazil
----------------	--

WoLLIC Steering Committee

Samson Abramsky	University of Oxford, UK
Johan van Benthem	University of Amsterdam, The Netherlands
Anuj Dawar	University of Cambridge, UK
Joe Halpern	Cornell University, USA
Wilfrid Hodges	Queen Mary, University of London, UK
Daniel Leivant	Indiana University, USA
Angus Macintyre	Queen Mary, University of London, UK
Grigori Mints	Stanford University, USA
Hiroakira Ono	Japan Advanced Institute of Science and Technology, Japan
Ruy de Queiroz	Universidade Federal de Pernambuco, Brazil

Additional Reviewers

Arisaka, Ryuta	Delaune, Stephanie
Arratia, Argimiro	Dung, Phan Minh
Atserias, Albert	Forssell, Henrik
Balat, Vincent	Giese, Martin
Barmpalias, George	Godo, Lluís
Berwanger, Dietmar	Hansen, Jens Ulrik
Bodirsky, Manuel	He, Chaodong
Boldo, Sylvie	Holzl, Rupert
Broersen, Jan	Kapulkin, Chris
Bursuc, Sergiu	Kishida, Kohei
Busaniche, Manuela	Koller, Alexander
Caicedo Ferrer, Xavier	Lazic, Ranko
Carnielli, Walter	Leroux, Jerome
Cignoli, Roberto	Loeding, Christof
Cruz-Filipe, Luis	Long, Huan
D'Agostino, Marcello	Longin, Dominique

Lozes, Etienne
Lu, Pinyan
Manya, Felip
Monin, Jean-Francois
Mostrous, Dimitris
Moyen, Jean-Yves
Nguyen Van Thé, Lionel
Nies, André
Oitavem, Isabel
Pacuit, Eric
Pedersen, Arthur Paul
Reimann, Jan
Romeijn, Jan-Willem
Rossman, Benjamin

Slaman, Theodore
Sojakova, Kristina
Terrell, Jeffrey
Terwijn, Sebastiaan
Uckelman, Sara L.
Valiron, Benoît
Van Eijck, Jan
Westera, Matthijs
Winter, Yoad
Wu, Yining
Zeilberger, Noam
Zhao, Jianjun
Zhou, Xiaocong
Zivny, Stanislav

Table of Contents

Invited Papers and Abstracts of Invited Lectures

Formalizing Turing Machines	1
<i>Andrea Asperti and Wilmer Ricciotti</i>	
Equivalence Relations That Are Σ_3^0 Complete for Computable Reducibility (Extended Abstract)	26
<i>Ekaterina Fokina, Sy Friedman, and André Nies</i>	
An Analysis of Directed Motion Expressions with Lexicalized Tree Adjoining Grammars and Frame Semantics	34
<i>Laura Kallmeyer and Rainer Osswald</i>	
Admissible Rules: From Characterizations to Applications	56
<i>George Metcalfe</i>	
On Distributed Monitoring of Asynchronous Systems	70
<i>Volker Diekert and Anca Muscholl</i>	
On the Expressive Power of Logics with Invariant Uses of Arithmetic Predicates	85
<i>Nicole Schweikardt</i>	
Logical Methods in Quantum Information Theory	88
<i>Peter Selinger</i>	
Quantifying Notes	89
<i>Hans van Ditmarsch</i>	

Contributed Papers

Linearizing Bad Sequences: Upper Bounds for the Product and Majoring Well Quasi-orders	110
<i>Sergio Abriola, Santiago Figueira, and Gabriel Senno</i>	
Initiality for Typed Syntax and Semantics	127
<i>Benedikt Ahrens</i>	
Moving Arrows and Four Model Checking Results	142
<i>Carlos Areces, Raul Fervari, and Guillaume Hoffmann</i>	
Standard Completeness for Extensions of MTL: An Automated Approach	154
<i>Paolo Baldi, Agata Ciabattini, and Lara Spendier</i>	

The Logic of Justified Belief Change, Soft Evidence and Defeasible Knowledge	168
<i>Alexandru Baltag, Bryan Renne, and Sonja Smets</i>	
Minimization via Duality	191
<i>Nick Bezhanishvili, Clemens Kupke, and Prakash Panangaden</i>	
On Some Subclasses of the Fodor-Roubens Fuzzy Bi-implication	206
<i>Claudio Callejas, João Marcos, and Benjamín René Callejas Bedregal</i>	
Linearity in the Non-deterministic Call-by-Value Setting	216
<i>Alejandro Díaz-Caro and Barbara Petit</i>	
Polynomial-Time Solution of Initial Value Problems Using Polynomial Enclosures	232
<i>Amin Farjudian</i>	
Algorithmic Randomness and Ramsey Properties of Countable Homogeneous Structures	246
<i>Willem L. Fouché</i>	
Propositional Reasoning about Saturated Conditional Probabilistic Independence	257
<i>Sebastian Link</i>	
Contracting Logics	268
<i>Márcio M. Ribeiro and Marcelo E. Coniglio</i>	
A Tight Upper Bound on the Number of Variables for Average-Case k -Clique on Ordered Graphs	282
<i>Benjamin Rossman</i>	
Preservation under Substructures modulo Bounded Cores	291
<i>Abhisekh Sankaran, Bharat Adsul, Vivek Madan, Pritish Kamath, and Supratik Chakraborty</i>	
A Logic of Plausible Justifications	306
<i>L. Menasché Schechter</i>	
Classic-Like Cut-Based Tableau Systems for Finite-Valued Logics	321
<i>Marco Volpe, João Marcos, and Carlos Caleiro</i>	
Author Index	337