

# **4th International Conference on Formal Structures for Computation and Deduction**

**FSCD 2019, June 24–30, 2019, Dortmund, Germany**

Edited by  
**Herman Geuvers**



*Editors*

**Herman Geuvers** 

Radboud University Nijmegen, The Netherlands  
Technical University Eindhoven, The Netherlands  
[herman@cs.ru.nl](mailto:herman@cs.ru.nl)

*ACM Classification 2012*

Theory of computation → Models of computation; Theory of computation → Formal languages and automata theory; Theory of computation → Logic; Theory of computation → Semantics and reasoning; Software and its engineering → Language features; Software and its engineering → Formal language definitions; Software and its engineering → Formal methods

**ISBN 978-3-95977-107-8**

*Published online and open access by*

Schloss Dagstuhl – Leibniz-Zentrum für Informatik GmbH, Dagstuhl Publishing, Saarbrücken/Wadern, Germany. Online available at <https://www.dagstuhl.de/dagpub/978-3-95977-107-8>.

*Publication date*

June, 2019

*Bibliographic information published by the Deutsche Nationalbibliothek*

The Deutsche Nationalbibliothek lists this publication in the Deutsche Nationalbibliografie; detailed bibliographic data are available in the Internet at <https://portal.dnb.de>.

*License*

This work is licensed under a Creative Commons Attribution 3.0 Unported license (CC-BY 3.0):  
<https://creativecommons.org/licenses/by/3.0/legalcode>.



In brief, this license authorizes each and everybody to share (to copy, distribute and transmit) the work under the following conditions, without impairing or restricting the authors' moral rights:

- Attribution: The work must be attributed to its authors.

The copyright is retained by the corresponding authors.

Digital Object Identifier: 10.4230/LIPIcs.FSCD.2019.0

**ISBN 978-3-95977-107-8**

**ISSN 1868-8969**

**<https://www.dagstuhl.de/lipics>**

## Contents

Preface <i>Herman Geuvers</i> .....	0:ix–0:x
Steering Committee .....	0:xi
Program Committee .....	0:xiii
External Reviewers .....	0:xv
List of Authors .....	0:xvii–0:xix

### Invited Talk

A Fresh Look at the $\lambda$ -Calculus <i>Beniamino Accattoli</i> .....	1:1–1:20
A Linear Logical Framework in Hybrid <i>Amy P. Felty</i> .....	2:1–2:2
Extending Maximal Completion <i>Sarah Winkler</i> .....	3:1–3:15
Some Semantic Issues in Probabilistic Programming Languages <i>Hongseok Yang</i> .....	4:1–4:6

### Regular Paper

Bicategories in Univalent Foundations <i>Benedikt Ahrens, Dan Frumin, Marco Maggesi, and Niels van der Weide</i> .....	5:1–5:17
Modular Specification of Monads Through Higher-Order Presentations <i>Benedikt Ahrens, André Hirschowitz, Ambroise Lafont, and Marco Maggesi</i> .....	6:1–6:19
Towards the Average-Case Analysis of Substitution Resolution in $\lambda$ -Calculus <i>Maciej Bendkowski</i> .....	7:1–7:21
Deriving an Abstract Machine for Strong Call by Need <i>Małgorzata Biernacka and Witold Charatonik</i> .....	8:1–8:20
Dependency Pairs Termination in Dependent Type Theory Modulo Rewriting <i>Frédéric Blanqui, Guillaume Genestier, and Olivier Hermant</i> .....	9:1–9:21
A Generic Framework for Higher-Order Generalizations <i>David M. Cerna and Temur Kutsia</i> .....	10:1–10:19
Homotopy Canonicity for Cubical Type Theory <i>Thierry Coquand, Simon Huber, and Christian Sattler</i> .....	11:1–11:23

4th International Conference on Formal Structures for Computation and Deduction (FSCD 2019).  
Editor: Herman Geuvers



LIPICS Leibniz International Proceedings in Informatics

Schloss Dagstuhl – Leibniz-Zentrum für Informatik, Dagstuhl Publishing, Germany

Polymorphic Higher-Order Termination <i>Lukasz Czajka and Cynthia Kop</i> .....	12:1–12:18
On the Taylor Expansion of Probabilistic $\lambda$ -terms <i>Ugo Dal Lago and Thomas Leventis</i> .....	13:1–13:16
Proof Normalisation in a Logic Identifying Isomorphic Propositions <i>Alejandro Díaz-Caro and Gilles Dowek</i> .....	14:1–14:23
$\lambda!$ -calculus, Intersection Types, and Involutions <i>Alberto Ciaffaglione, Pietro Di Gianantonio, Furio Honsell, Marina Lenisa, and Ivan Scagnetto</i> .....	15:1–15:16
Template Games, Simple Games, and Day Convolution <i>Clovis Eberhart, Tom Hirschowitz, and Alexis Laouar</i> .....	16:1–16:19
Differentials and Distances in Probabilistic Coherence Spaces <i>Thomas Ehrhard</i> .....	17:1–17:17
Modal Embeddings and Calling Paradigms <i>José Espírito Santo, Luís Pinto, and Tarmo Uustalu</i> .....	18:1–18:20
Probabilistic Rewriting: Normalization, Termination, and Unique Normal Forms <i>Claudia Faggian</i> .....	19:1–19:25
A Linear-Logical Reconstruction of Intuitionistic Modal Logic S4 <i>Yosuke Fukuda and Akira Yoshimizu</i> .....	20:1–20:24
Sparse Tiling Through Overlap Closures for Termination of String Rewriting <i>Alfons Geser, Dieter Hofbauer, and Johannes Waldmann</i> .....	21:1–21:21
Proof Nets for First-Order Additive Linear Logic <i>Willem B. Heijltjes, Dominic J. D. Hughes, and Lutz Straßburger</i> .....	22:1–22:22
The Sub-Additives: A Proof Theory for Probabilistic Choice extending Linear Logic <i>Ross Horne</i> .....	23:1–23:16
A Lower Bound of the Number of Rewrite Rules Obtained by Homological Methods <i>Mirai Ikebuchi</i> .....	24:1–24:18
Gluing for Type Theory <i>Ambrus Kaposi, Simon Huber, and Christian Sattler</i> .....	25:1–25:20
The Discriminating Power of the Let-In Operator in the Lazy Call-by-Name Probabilistic $\lambda$ -Calculus <i>Simona Kašterović and Michele Pagani</i> .....	26:1–26:20
Hilbert’s Tenth Problem in Coq <i>Dominique Larchey-Wendling and Yannick Forster</i> .....	27:1–27:20
The $\Delta$ -calculus: Syntax and Types <i>Luigi Liquori and Claude Stolze</i> .....	28:1–28:20
Pointers in Recursion: Exploring the Tropics <i>Paulin Jacobé de Naurois</i> .....	29:1–29:18

Typed Equivalence of Effect Handlers and Delimited Control <i>Maciej Piróg, Piotr Polesiuk, and Filip Sieczkowski</i>	30:1–30:16
Cubical Syntax for Reflection-Free Extensional Equality <i>Jonathan Sterling, Carlo Angiuli, and Daniel Gratzer</i>	31:1–31:25
Guarded Recursion in Agda via Sized Types <i>Niccolò Veltri and Niels van der Weide</i>	32:1–32:19
Sequence Types for Hereditary Permutators <i>Pierre Vial</i>	33:1–33:15

## System Description

Model Checking Strategy-Controlled Rewriting Systems <i>Rubén Rubio, Narciso Martí-Oliet, Isabel Pita, and Alberto Verdejo</i>	34:1–34:18
---	------------