

# 20th International Conference on Types for Proofs and Programs

TYPES'14, May 12–15, 2014, Paris, France

Edited by

Hugo Herbelin  
Pierre Letouzey  
Matthieu Sozeau



*Editors*

Hugo Herbelin	Pierre Letouzey	Matthieu Sozeau
$\pi r^2$ team, P.P.S. laboratory	$\pi r^2$ team, P.P.S. laboratory	$\pi r^2$ team, P.P.S. laboratory
INRIA & Université Paris Diderot	INRIA & Université Paris Diderot	INRIA & Université Paris Diderot
France	France	France
<a href="mailto:hugo.herbelin@inria.fr">hugo.herbelin@inria.fr</a>	<a href="mailto:pierre.letouzey@inria.fr">pierre.letouzey@inria.fr</a>	<a href="mailto:matthieu.sozeau@inria.fr">matthieu.sozeau@inria.fr</a>

*ACM Classification 1998*

D.1.1 Applicative (Functional) Programming, D.2.4 Software/Program Verification, F.3.1 Specifying and Verifying and Reasoning about Programs, F.4.1 Mathematical Logic

**ISBN 978-3-939897-88-0**

*Published online and open access by*

Schloss Dagstuhl – Leibniz-Zentrum für Informatik GmbH, Dagstuhl Publishing, Saarbrücken/Wadern, Germany. Online available at <http://www.dagstuhl.de/dagpub/978-3-939897-88-0>.

*Publication date*

October, 2015

*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 <http://dnb.d-nb.de>.

*License*

This work is licensed under a Creative Commons Attribution 3.0 Unported license (CC-BY 3.0): <http://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.TYPES.2014.i

**ISBN 978-3-939897-88-0**

**ISSN 1868-8969**

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

## ■ Contents

Preface	
<i>Hugo Herbelin, Pierre Letouzey, and Matthieu Sozeau</i> .....	vii
Terminal Semantics for Codata Types in Intensional Martin-Löf Type Theory	
<i>Benedikt Ahrens and Régis Spadotti</i> .....	1
A Calculus of Constructions with Explicit Subtyping	
<i>Ali Assaf</i> .....	27
Objects and Subtyping in the $\lambda\Pi$ -Calculus Modulo	
<i>Raphaël Cauderlier and Catherine Dubois</i> .....	47
Typeful Normalization by Evaluation	
<i>Olivier Danvy, Chantal Keller, and Matthias Puech</i> .....	72
Dialectica Categories and Games with Bidding	
<i>Jules Hedges</i> .....	89
The General Universal Property of the Propositional Truncation	
<i>Nicolai Kraus</i> .....	111
On the Structure of Classical Realizability Models of ZF	
<i>Jean-Louis Krivine</i> .....	146
An Extensional Kleene Realizability Semantics for the Minimalist Foundation	
<i>Maria Emilia Maietti and Samuele Maschio</i> .....	162
Investigating Streamless Sets	
<i>Erik Parmann</i> .....	187
Nominal Presentation of Cubical Sets Models of Type Theory	
<i>Andrew M. Pitts</i> .....	202
On Extensionality of $\lambda^*$	
<i>Andrew Polonsky</i> .....	221
Restricted Positive Quantification Is Not Elementary	
<i>Aleksy Schubert, Paweł Urzyczyn, and Daria Walukiewicz-Chrzęszcz</i> .....	251
On Isomorphism of Dependent Products in a Typed Logical Framework	
<i>Sergei Soloviev</i> .....	274
An Intuitionistic Analysis of Size-change Termination	
<i>Silvia Steila</i> .....	288