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Reflections

on Type Theory, λ -Calculus, and the Mind

*Essays Dedicated to Henk Barendregt
on the Occasion of his 60th Birthday*

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Hendrik Pieter Barendregt

PREFACE

December 18, 2007 was Henk Barendregt's 60th birthday. To celebrate this event, we organised a one-day symposium with the title

‘Reflections on Type Theory, λ -Calculus and the Mind’,

which was held on December 17, 2007 at the Radboud University Nijmegen, organised by Erik Barendsen, Venanzio Capretta, Herman Geuvers, Nicole Messink and Milad Niqui. The web site associated with the symposium, <http://www.cs.ru.nl/barendregt60>, gives an impression of the meeting, an online edition of the present book, and additional material. The symposium consisted of invited talks by:

- Corrado Böhm
- Mariangiola Dezani-Ciancaglini
- Jan Willem Klop
- Jean-Jacques Lévy
- Giuseppe Longo
- Bill Phillips
- Gordon Plotkin
- Anne Speckens
- Richard Statman

At the symposium, this book was given to Henk Barendregt as a present, to thank him for all the beautiful results and all the inspiration he has given us.

We solicited papers from all former PhD students of Henk Barendregt. (See below for a complete list.) These contributions were not required to be scientific papers; also more ‘informal’ articles could be submitted. These papers have gone through a lightweight refereeing process, leading to considerable changes and improvements in some of the papers. Furthermore, the invited speakers for the symposium were asked to contribute a paper, which some of them did.

This volume celebrates the extraordinary breadth and depth of Henk's contributions, and with it we pay tribute to Henk Barendregt as an inspiring scientist, teacher and communicator.

We want to thank all authors who have contributed a paper for making this book as nice as it is. Furthermore, we thank the invited speakers and everybody who participated in the symposium for making it a success. Finally, we want to acknowledge financial support from NWO and the Faculty of Science of the Radboud University Nijmegen.

Van harte gefeliciteerd Henk!

The editors,
Erik Barendsen, Venanzio Capretta,
Herman Geuvers, Milad Niqui.

PHD STUDENTS OF HENK BARENDREGT

Throughout the years Henk Barendregt has supervised many PhD students in various universities. Below is a list — in chronological order — of people who obtained their PhD degree with Henk Barendregt as *promotor*. Included are the title of the theses and the year and place of PhD defence.

- 1987:** R.C. de Vrijer
Surjective pairing and strong normalization: two themes in lambda calculus
VU University Amsterdam
- 1988:** M.C.J.D. van Eekelen
Parallel graph rewriting, some contributions to its theory, its implementation and its application
Radboud University Nijmegen
- 1989:** P.H. Hartel
Performance analysis of storage management in combinator graph reduction
University of Amsterdam
- 1990:** P.W.M. Koopman
Functional Programs as Executable Specifications
Radboud University Nijmegen
- 1991:** B.P.F. Jacobs
Categorical Type Theory
Radboud University Nijmegen
- 1993:** L. Helmink
Tools for Proofs and Programs
University of Amsterdam
- 1993:** S.J. van Bakel
Intersection Type Disciplines in Lambda Calculus and Applicative Term Rewriting Systems
Radboud University Nijmegen
- 1993:** J.E.W. Smetsers
Graph Rewriting and Functional Languages
Radboud University Nijmegen
- 1993:** A.J.C. Hurkens
Borel Determinacy without the Axiom of Choice
Radboud University Nijmegen
- 1993:** J.H. Geuvers
Logics and Type Systems
Radboud University Nijmegen
- 1993:** S. Ghilezan
Intersection types in lambda calculus and logic
University of Novi Sad

- 1994:** E.G.J.M.H. Nöcker
Efficient Functional Programming - Compilation and Programming Techniques
 Radboud University Nijmegen
- 1994:** J. Kuper
Partiality in Logic and Computation - Aspects of Undefinedness
 University of Twente
- 1994:** E. Poll
A Programming Logic Based on Type Theory
 Eindhoven University of Technology
- 1995:** A.B. Compagnoni
Higher-Order Subtyping with Intersection Types
 Radboud University Nijmegen
- 1995:** E. Barendsen
Types and Computations in Lambda Calculi and Graph Rewrite Systems
 Radboud University Nijmegen
- 1995:** J.-P. van Draanen
Models for simply typed lambda-calculi with fixed point combinators and enumerators
 Radboud University Nijmegen
- 1996:** P. Severi
Normalisation in Lambda Calculus and its relation to Type Inference
 Eindhoven University of Technology
- 1996:** M. Dezani-Ciancaglini
Logical Semantics for Concurrent Lambda-Calculus
 Radboud University Nijmegen
- 1997:** M.H. Sørensen
Normalization in Lambda-Calculus and Type Theory
 University of Copenhagen
- 1999:** M. Stephanova
Properties of typing systems
 Radboud University Nijmegen
- 1999:** M.P.J. Ruys
Studies in mechanical verification of mathematical proofs
 Radboud University Nijmegen
- 1999:** J. Zwanenburg
Object-Oriented Concepts and Proof Rules: Formalization in Type Theory and Implementation in Yarrow
 Eindhoven University of Technology
- 2000:** S. Valentini
Meta-mathematical aspects of Martin-Löf's type theory
 Radboud University Nijmegen
- 2001:** M. Huisman
Reasoning about Java programs in higher order logic using PVS and Isabelle
 Radboud University Nijmegen
- 2001:** M.D. Oostdijk
Generation and presentation of formal mathematical documents
 Eindhoven University of Technology

- 2002:** V. Capretta
Abstraction and Computation. Type Theory, Algebraic Structures, and Recursive Functions
Radboud University Nijmegen
- 2003:** B.A.W. Spitters
Constructive and intuitionistic integration theory and functional analysis
Radboud University Nijmegen
- 2004:** G.I. Jojgov
Incomplete Proofs and Terms and Their Use in Interactive Theorem Proving
Eindhoven University of Technology
- 2004:** L. Cruz-Filipe
Constructive Real Analysis: A Type-Theoretical Formalization and Applications
Radboud University Nijmegen
- 2004:** M. Niqui
Formalising Exact Arithmetic: Representations, Algorithms and Proofs
Radboud University Nijmegen
- 2006:** A.K. Honingh
The Origin and Well-Formedness of Tonal Pitch Structures
University of Amsterdam
- 2006:** M. Calle
Integrative Physiology and Communication in the Amphibian Brain
Radboud University Nijmegen

ESSAYS

Classical Sequents and Computation : An Overview <i>Steffen van Bakel</i>	13
Strictness Analysis via Resource Typing <i>Erik Barendsen and Sjaak Smetsers</i>	29
Sharing in the Weak Lambda-Calculus Revisited <i>Tomasz Blanc and Jean-Jacques Lévy and Luc Maranget</i>	41
Common Knowledge as a Coinductive Modality <i>Venanzio Capretta</i>	51
Subtyping à la Church <i>Adriana Compagnoni and Healfdene Goguen</i>	63
Intersection and Reference Types <i>Mariangiola Dezani-Ciancaglini and Simona Ronchi Della Rocca</i>	77
Proving Lazy Folklore with Mixed Lazy/Strict Semantics <i>Marko van Eekelen and Maarten de Mol</i>	87
Iteration and Primitive Recursion in Categorical Terms <i>Herman Geuvers and Erik Poll</i>	101
Terms for Natural Deduction, Sequent Calculus and Cut Elimination in Classical Logic <i>Silvia Ghilezan</i>	115
Lambda Calculus for Engineers <i>Pieter H. Hartel and Willem G. Vree</i>	125
Intonation and Temperament: A Special Orchestral Rehearsal <i>Aline Honingh</i>	139
Permission Specifications for Common Multithreaded Programming Patterns <i>Marieke Huisman and Clément Hurlin</i>	147
Phine Numbers <i>A.J.C. Hurkens</i>	161

On Henk Barendregt's Favorite Open Problem <i>Benedetto Intrigila and Richard Statman</i>	173
Semantics of Grammars and Attributes via Initiality <i>Bart Jacobs and Tarmo Uustalu</i>	181
New Fixed Point Combinators from Old <i>Jan Willem Klop</i>	197
Systematic Synthesis of λ -Terms <i>Pieter Koopman and Rinus Plasmeijer</i>	211
Binary Relations as a Foundation of Mathematics <i>Jan Kuper</i>	223
DNA, Differential Methods and the Böhm-out Technique <i>Giuseppe Longo and Pierre-Emmanuel Tendero</i>	233
Infinite Multi-bases <i>Paula Severi</i>	245
Sequent Calculus, Dialogues, and Cut-Elimination <i>Morten Heine Sørensen and Paweł Urzyczyn</i>	253
A Strong Normalisation Condition for Pure Type Systems <i>Milena Stefanova and Silvio Valentini</i>	263
Barendregt's Lemma <i>Roel de Vrijer</i>	275