In Memoriam

Martin Hofmann

Benjamin C. Pierce

with help from Thorsten Altenkirch, Nick Benton, Lennart Beringer, Ugo Dal Lago, Javier Esparza, Favonia, Jan Hoffman, Annette Fischer, Jan Johannsen, Martin Lange, Uwe Nestmann, Tobias Nipkow, Randy Pollack, Don Sannella, Thomas Streicher, and Martin Wirsing

Photo by Dusko Pavlovic, 2015

MH, Thomas Streicher, “**The Groupoid Model Refutes Uniqueness of Identity Proofs**”, 1994

Thorsten Altenkirch, MH, Thomas Streicher, “**Reduction-Free Normalisation for a Polymorphic System**”, 1996

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MH, Wei Chen: **Abstract interpretation from Büchi automata**. 2014

Martin Hofmann, Jeremy Ledent. **A cartesian-closed category for higher-order model checking**. 2017

PC member in 2015, 2013, 2004, 2000

PC chair in 2018

Martin and LICS

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Martin and LICS

Nick Benton (17)
Lennart Beringer (15)
BCP (8)
Thomas Streicher (8)
Hans-Wolfgang Loidl (8)
Vivek Nigam (8)
Ugo Dal Lago (7)
Thorsten Altenkirch (6)
Steffen Jost (6)
Amal Ahmed (6)
David Aspinall (6)
Jan Hoffmann (5)
Ulrich Schöpp (5)
Andrew Kennedy (4)
Alberto Momigliano (4)
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Klaus Aehlig (4)
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Dulma Rodriguez (4)
Norman Scaife (3)
Ramyaa (3)
J. Gregory Morrisett (3)
Lars Birkedal (3)
Ian Stark (3)
Serdar Erbatur (3)
Robert Grabowski (3)
Georg Moser (3)
Aleksandr Karbyshev (3)
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Philip J. Scott (2)
Reinhold Heckmann (2)
Robert F. Pointon (2)
Roy Dyckhoff (2)
Olha Shkaravska (2)
Helmut Seidl (2)
Jocelyn Sérot (2)
John Hughes (2)
Wei Chen (2)
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Mariela Pavlova (2)
Andy Wallace (2)
Martin Lange (2)
Eugen Zalinescu (2)
Martín Hötzel Escardó (2)
Christoph Senjak (2)
Andrej Bauer (2)
Stephen Gilmore (2)
Greg J. Michaelson (2)
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Helmut Schwichtenberg (1)
Peter Dybjer (1)
Peter Müller (1)
Pierre Crégut (1)
Ivan Scagnetto (1)
Richard Garner (1)
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Jaap van Oosten (1)
Sabine Bauer (1)
Jeremy Ledent (1)
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Pawel Urzyczyn (1)
Axel Rauschmayer (1)
Stephen Bellantoni (1)
Pierre-Louis Curien (1)
Erik Poll (1)
Jirí Adámek (1)
Thierry Coquand (1)
Ulrich Berger 0001 (1)
Kenneth MacKenzie (1)
Christian Dax (1)
Francis Tang (1)
Keqin Li (1)
Wolfgang Naraschewski (1)
Furio Honsell (1)
Eric Vétillard (1)
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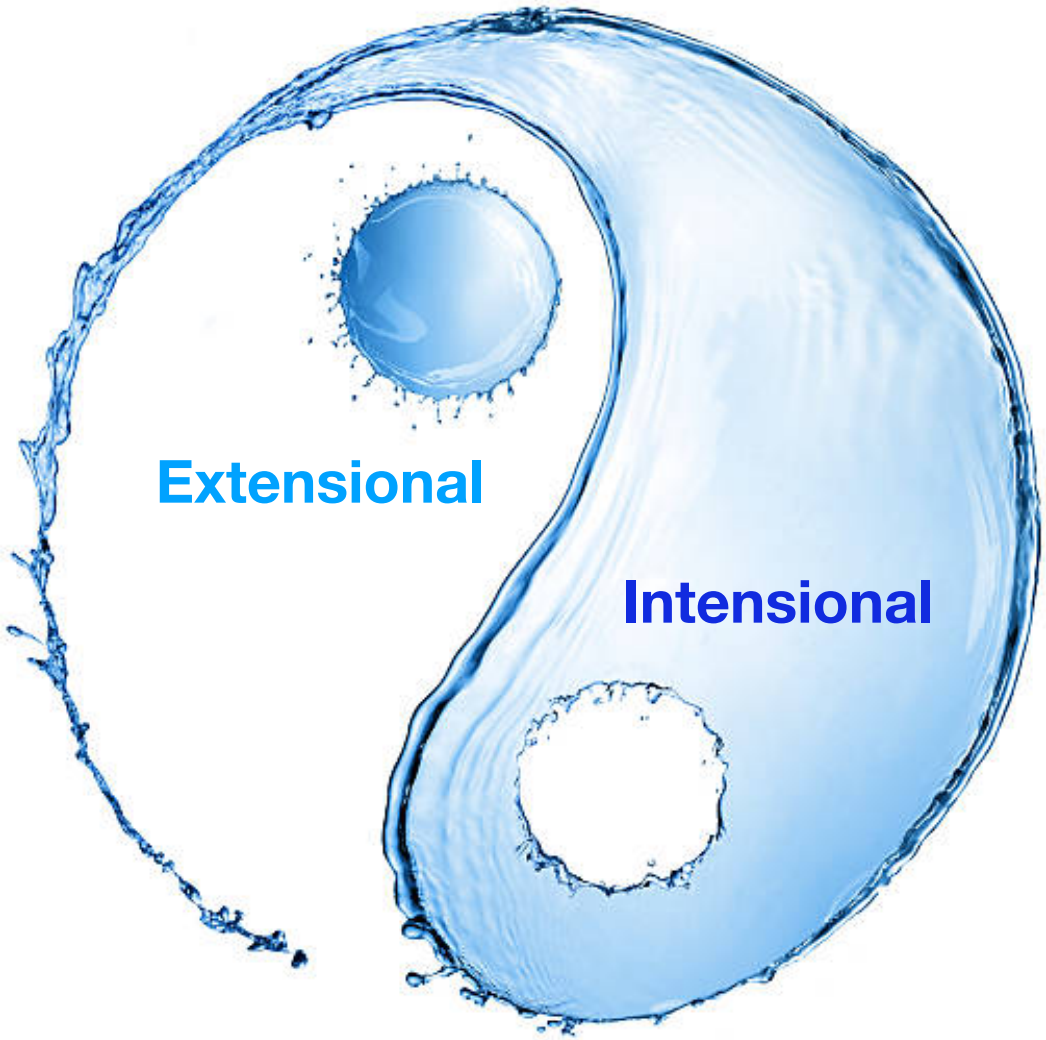
Marino Miculan (1)
Christian Neukirchen (1)
Gilles Barthe (1)
Terry Stroup (1)
Benjamin Grégoire (1)
Martin Steffen (1)
Giuseppe Rosolini (1)
Martin Wirsing (1)
Gordon Cichon (1)
Masahito Hasegawa (1)
Matija Pretnar (1)
Gordon D. Plotkin (1)
Matthias Felleisen (1)
Anna Bucalo (1)
Michal Konecný (1)
James Gabbay (1)

Collaborators

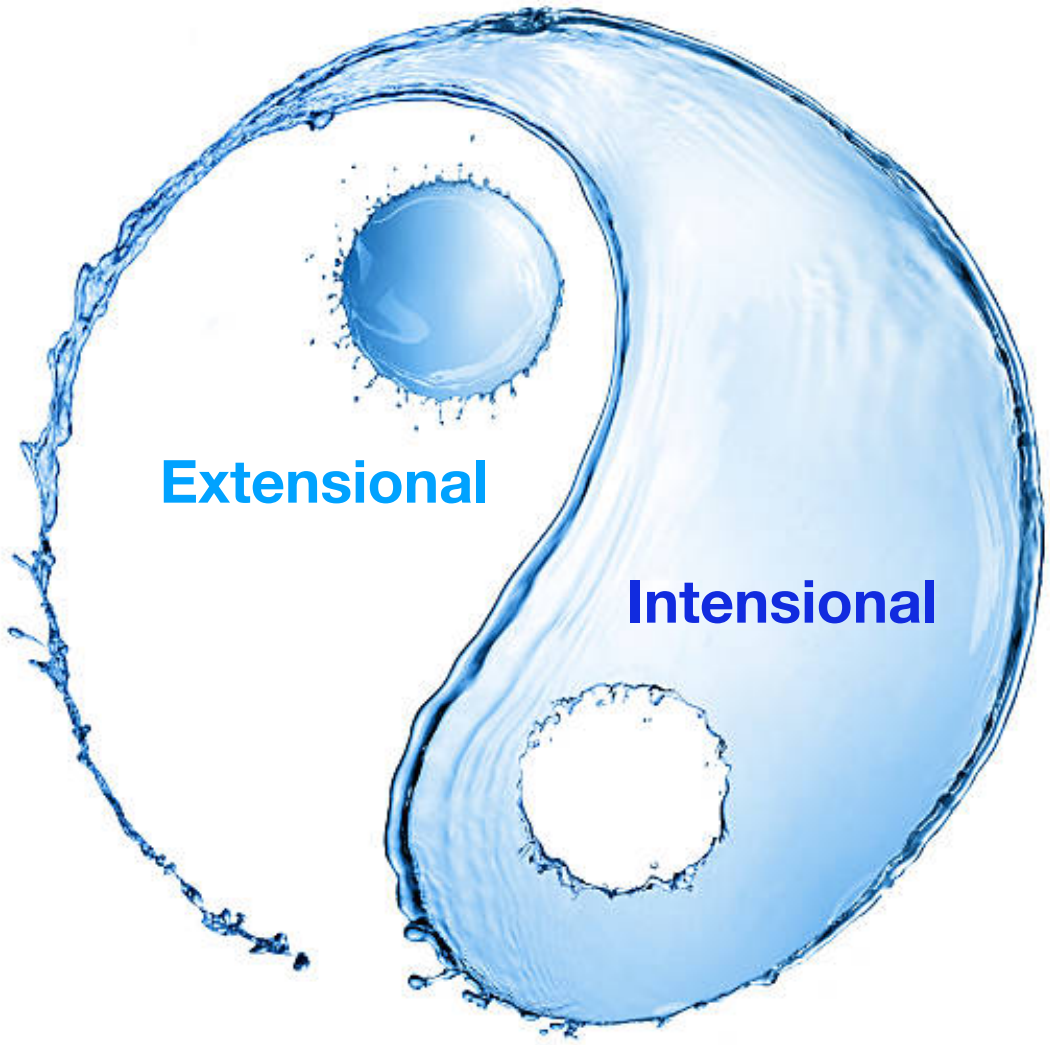

Artificial Intelligence
A Modern Approach
DEITEL & DEITEL
JAVA
JAVA Standards
PST
Pearson Studium

1965	Born in Erlangen, Germany
1984 - 1991	Undergraduate studies (Diplom in Informatics), University of Erlangen
1987 - 1988	Undergraduate studies (Maitrise de Mathematiques), Université de Nice
1990	Married to Annette Fischer
1991 - 1995	PhD studies at LFCS, University of Edinburgh
1993	Daughter Johanna born
1995 - 1998	Research assistant, University of Darmstadt (Habilitation, June 1999)
1996	Son Matthias born
1998 - 2001	Lecturer and Reader, University of Edinburgh
2001	Assistant professor, University of Darmstadt
2001 - 2018	Professor, Ludwig-Maximillians University, Munich
2001	Daughter Elisabeth born
2018	died in Japan


Extensional
Intensional

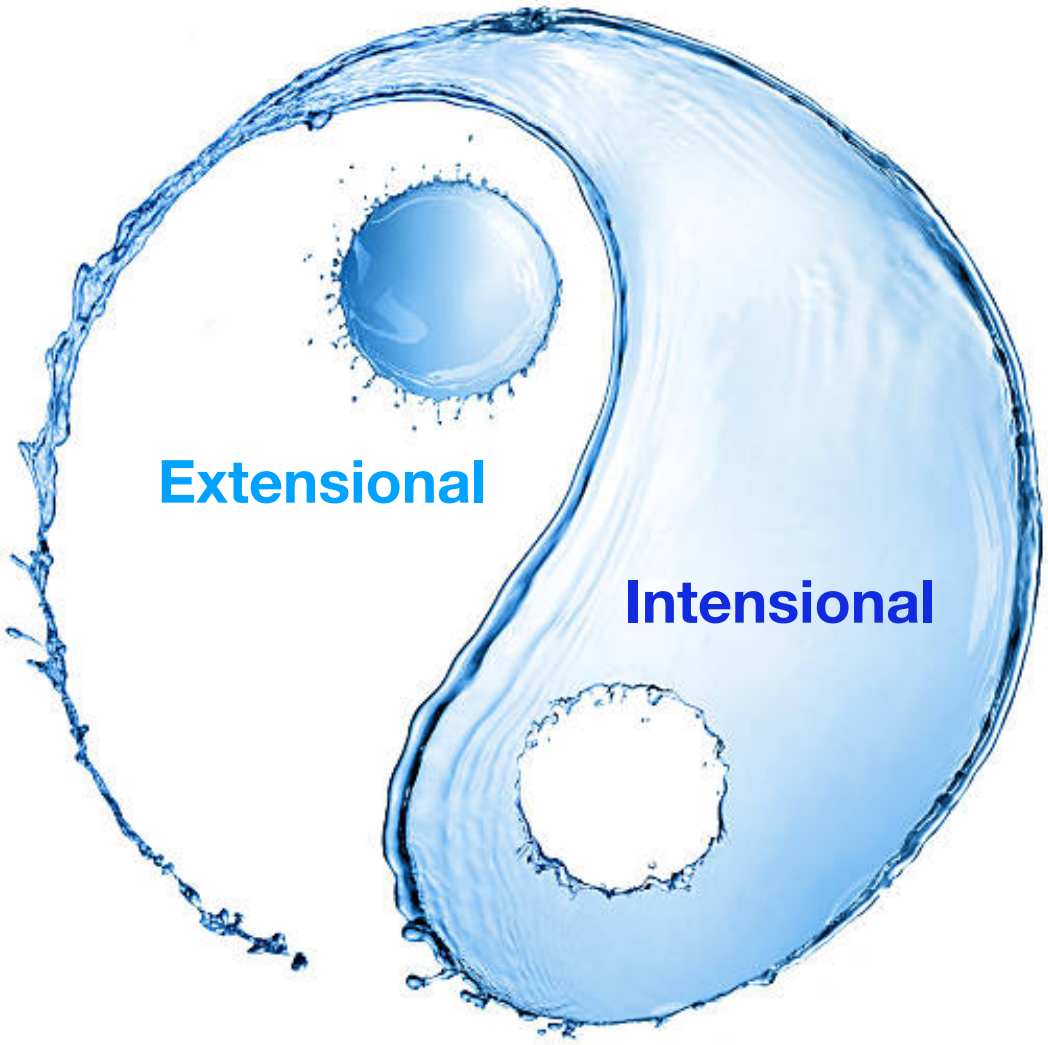
Martin Hofmann was most known for his research on the relationship between extensional properties (input/output semantics) and intensional properties (relating to the code/ algorithm) of computation. This started with his PhD thesis, which showed how the convenience and power of extensional reasoning could be soundly obtained within intensional type theory.

—Sannella & Hußmann


Extensional
Intensional

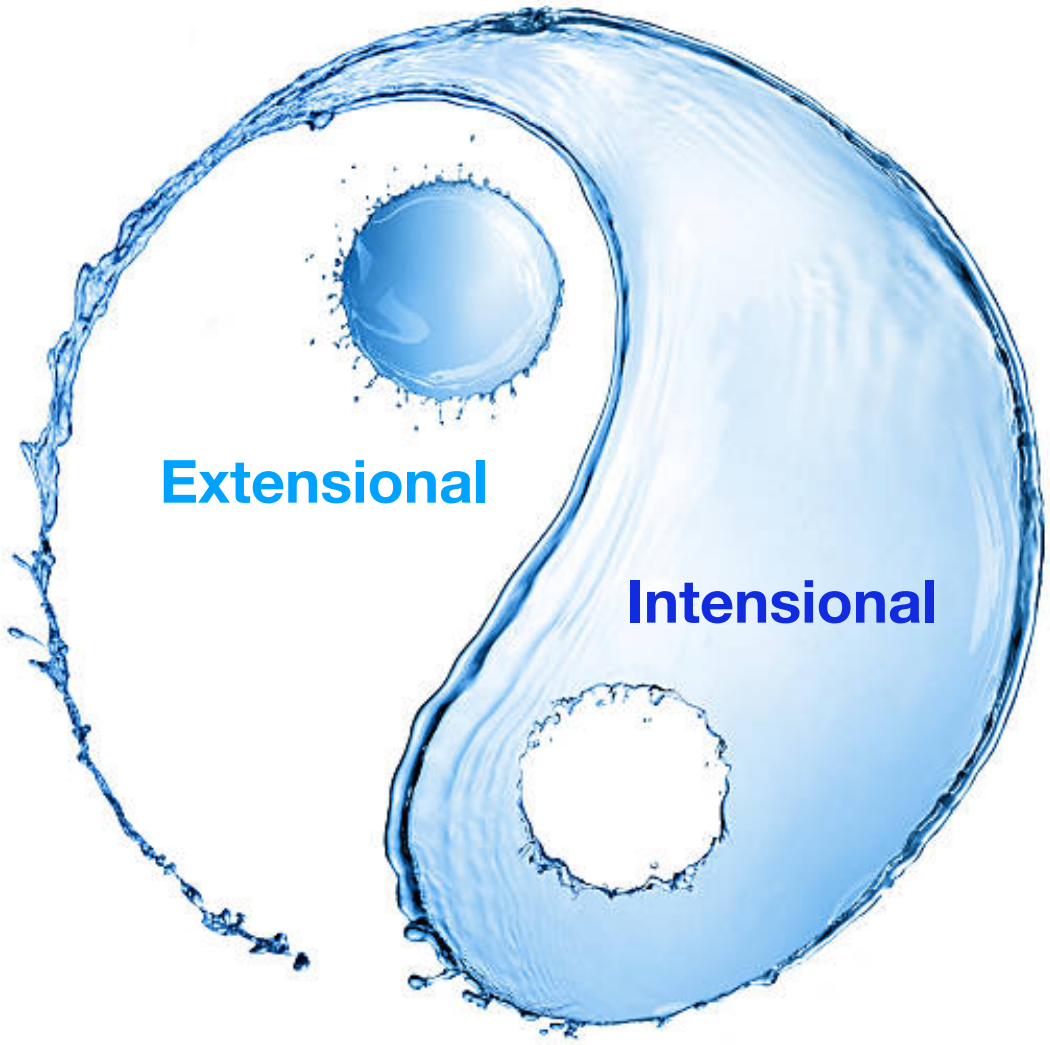
Type theory and semantics

1995-



Type theory and semantics

1995-

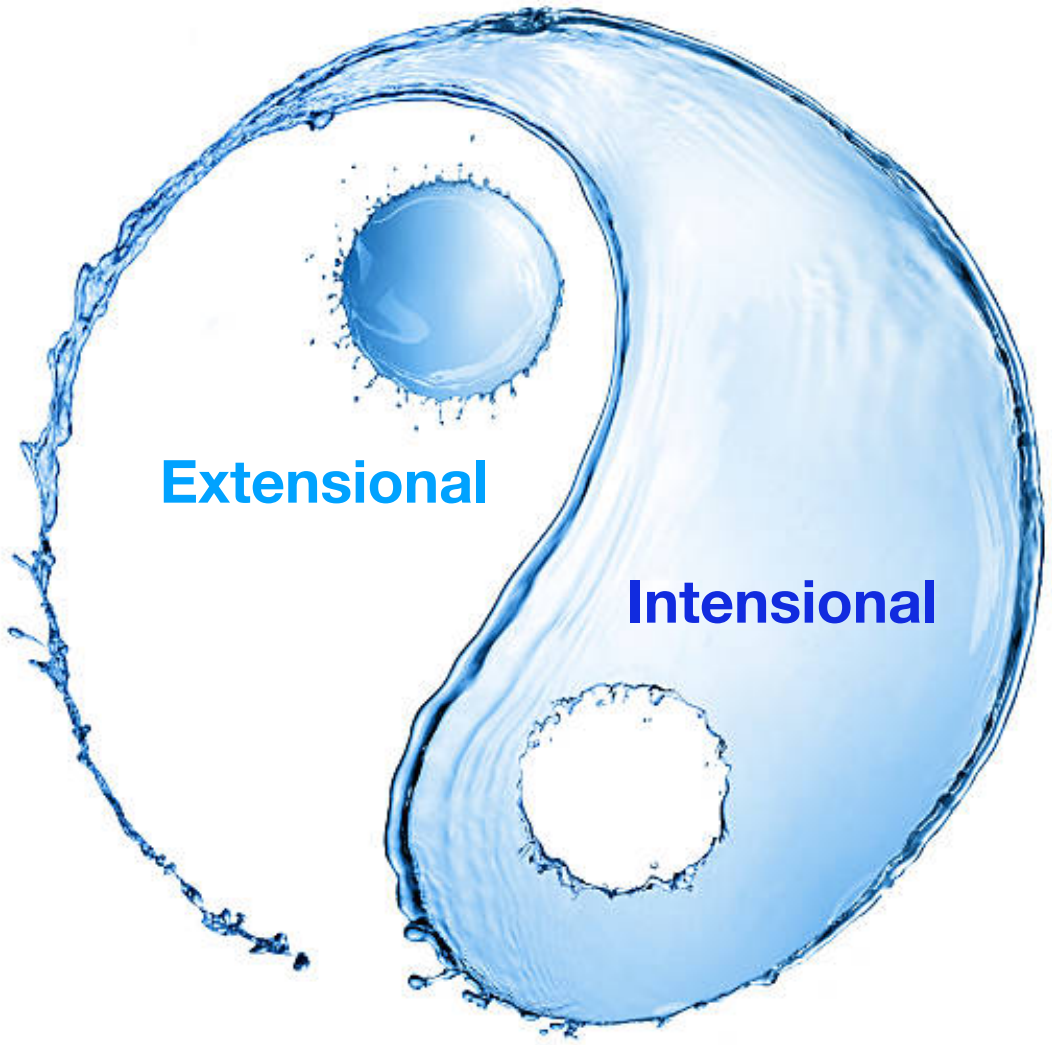


Types and asymptotic complexity

1998-

Type theory and semantics

1995-



Types and asymptotic complexity

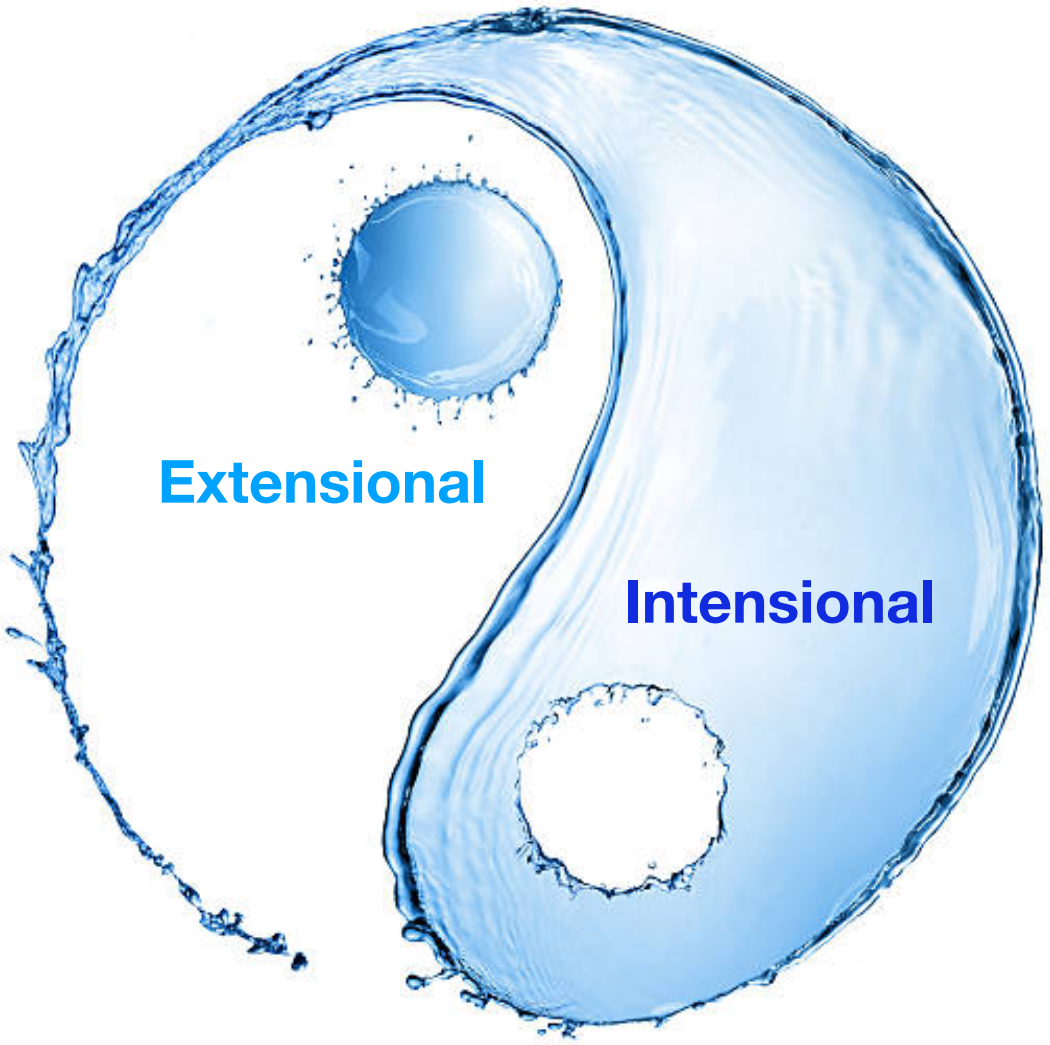
1998-

Types for resource bounds

2000-

Type theory and semantics

1995-



Types and asymptotic complexity

1998-

Relational semantics of effects

2007-

Types for resource bounds

2000-

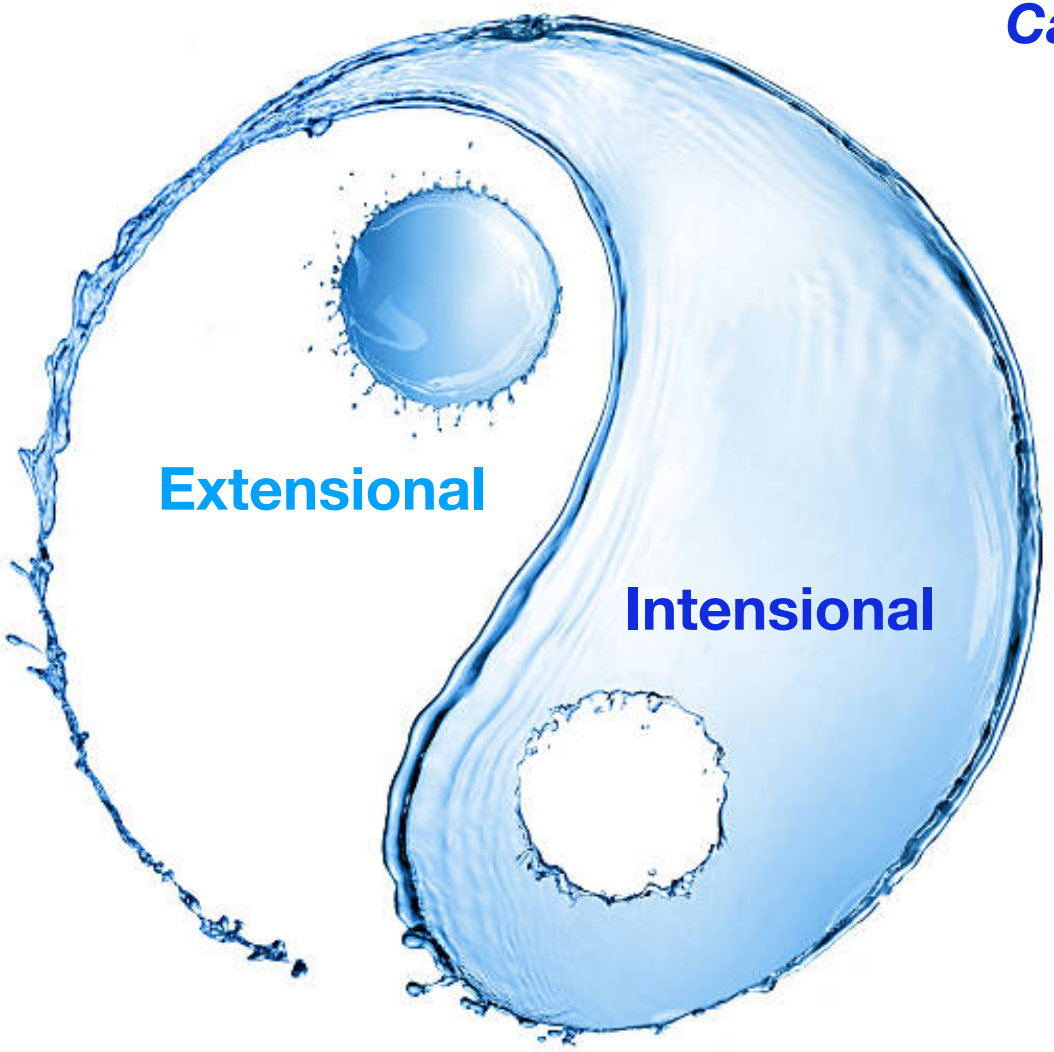
Categories

Type theory and semantics

1995-

Types and asymptotic complexity

1998-



Relational semantics of effects

2007-

Types for resource bounds

2000-

Erlangen


Denmark
Sweden
Netherlands
Poland
Germany
Belgium
Czech Rep.
Erlangen
France
Slovaki
Austria
Switzerland
Hungary
Italy

University of Erlangen

Informatics

Verifikation von ML-Programmen mit dem Beweisprüfer Lego

Diplomarbeit im Fach Informatik

Martin Hofmann-Fischer
geboren am 9. November 1965
in Erlangen

Lehrstuhl für Informatik VII
Rechnerarchitektur und -Verkehrstheorie
Institut für Mathematische Maschinen und Datenverarbeitung
Friedrich-Alexander-Universität Erlangen-Nürnberg

Betreuer: Dr. Terry Stroup und Norbert Götz

Beginn: 8. Februar 1991
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Randy Pollack

Hetzelsdorf

Edinburgh

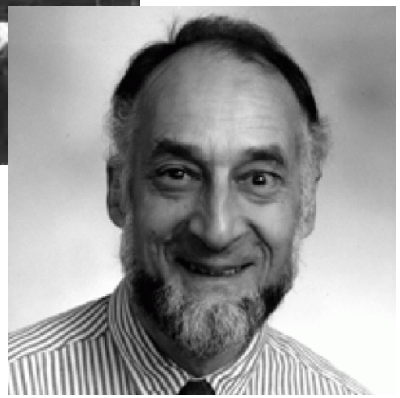
THE UNIVERSITY of EDINBURGH

James Clerk Maxwell Building
Kings Buildings
University of Edinburgh

lfcs | Laboratory for Foundations of Computer Science

Gordon Plotkin

Robin Milner



Don Sannella

Rod Burstall

Martin and me

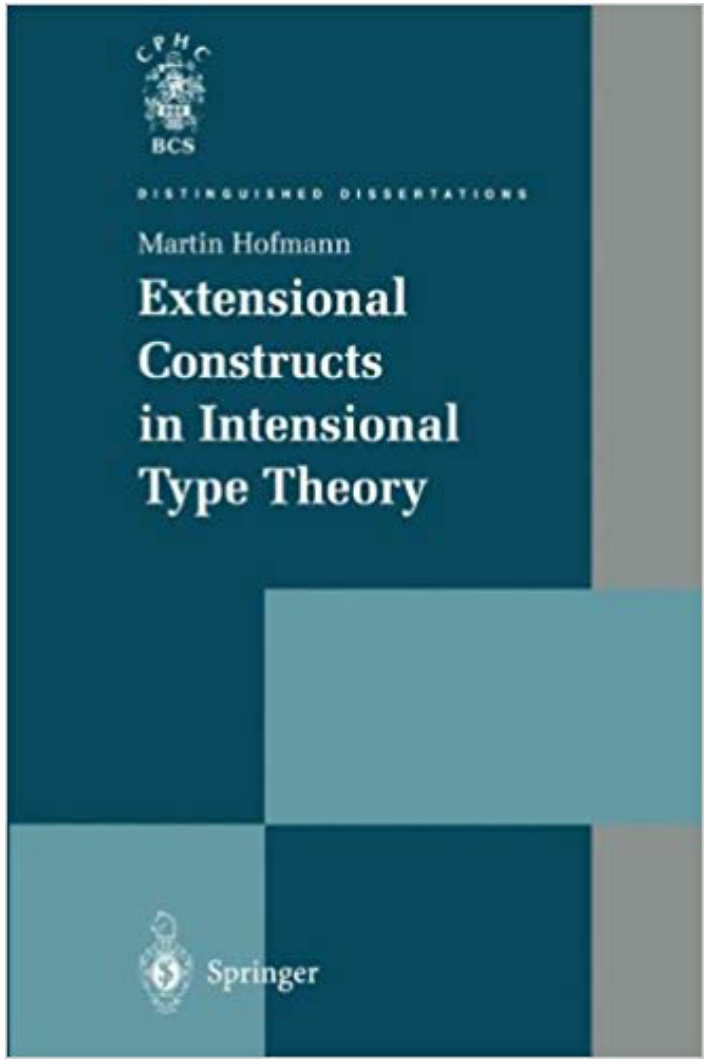
MH, BCP, "**A Unifying Type-Theoretic Framework for Objects**", STACS 1994 and JFP 1995

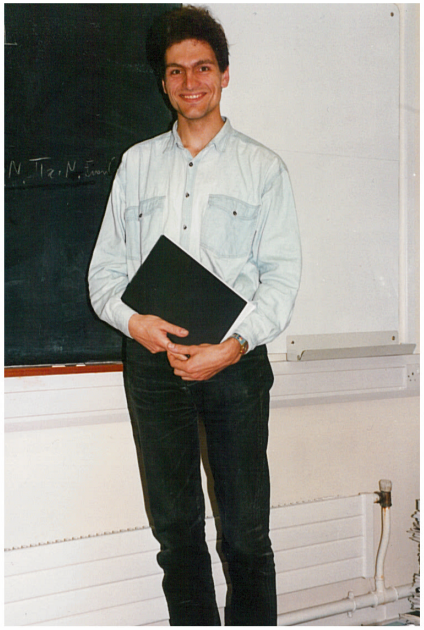
MH, BCP, "**Positive Subtyping**", POPL 1995 and I&C 1996

MH, BCP, "**Type Destructors**", FOOL 1998 and I&C 2002

MH, BCP, Daniel Wagner, "**Symmetric lenses**", POPL 2011

MH, BCP, Daniel Wagner, "**Edit lenses**", POPL 2012





Abstract: … The main result of the thesis consists of the construction of two models in which functional extensionality and quotient types are available. In the first one types are modelled by types together with proposition-valued partial equivalence relations. This model is rather simple and in addition provides subset types and propositional extensionality. However, it does not furnish proper dependent types such as vectors or matrices. We try to overcome this disadvantage by using another model based on families of type-valued equivalence relations which is however much more complicated and validates certain conversion rules only up to propositional equality. …

TITLE	CITED BY	YEAR
Static prediction of heap space usage for first-order functional programs M Hofmann, S Jost ACM SIGPLAN Notices 38 (1), 185-197	349	2003
The groupoid interpretation of type theory M Hofmann, T Streicher Twenty-five years of constructive type theory (Venice, 1995) 36, 83-111	248	1998
Linear types and non-size-increasing polynomial time computation M Hofmann Information and Computation 183 (1), 57-85	236	2003
Semantical analysis of higher-order abstract syntax M Hofmann Logic in Computer Science, 1999. Proceedings. 14th Symposium on, 204-213	207	1999
Syntax and semantics of dependent types M Hofmann Extensional Constructs in Intensional Type Theory, 13-54	194	1997
A type system for bounded space and functional in-place update M Hofmann European Symposium on Programming, 165-179	180	2000
Extensional concepts in intensional type theory M Hofmann University of Edinburgh. College of Science and Engineering. School of …	174	1995
Type-based amortised heap-space analysis M Hofmann, S Jost European Symposium on Programming, 22-37	137	2006
Symmetric lenses M Hofmann, B Pierce, D Wagner ACM SIGPLAN Notices 46 (1), 371-384	109	2011

Cameron and Thorsten Altenkirch, with Annette and Martin, 2017

Darmstadt

TYPE SYSTEMS FOR POLYNOMIAL-TIME COMPUTATION

Vom Fachbereich Mathematik
der Technischen Universität Darmstadt
angenommene

HABILITATIONSSCHRIFT

von

Martin Hofmann, PhD

aus Erlangen

Referenten:
Prof. Dr. Th. Streicher (Darmstadt)
Prof. Dr. K. Keimel (Darmstadt)
Prof. Dr. D. Basin (Freiburg)
Prof. Ph. Scott, PhD (Ottawa)

Tag der Einreichung: 30. Oktober 1998
Tag des wissenschaftlichen Gesprächs: 12. Februar 1999

"This thesis introduces and studies a typed lambda calculus with higher-order primitive recursion over inductive datatypes which has the property that all definable number-theoretic functions are polynomial time computable. This is achieved by imposing type-theoretic restrictions on the way results of recursive calls can be used."

Edinburgh

2000

A Type System for Bounded Space and Functional In-Place Update—Extended Abstract

Martin Hofmann

LFCS Edinburgh, Mayfield Rd, Edinburgh EH9 3JZ, UK
mxh@dcs.ed.ac.uk

Abstract: We show how linear typing can be used to obtain functional programs which modify heap-allocated data structures in place. We present this both as a "design pattern" for writing C-code in a functional style and as a compilation process from linearly typed first-order functional programs into malloc()-free C code…. The crucial innovation over previous linear typing schemes consists of the introduction of a resource type $\diamond$ which controls the number of constructor symbols such as cons in recursive definitions and ensures linear space while restricting expressive power surprisingly little.

Static Prediction of Heap Space Usage for First-Order Functional Programs

(Extended Version)

Martin Hofmann Steffen Jost

LMU München, Institut für Informatik
Oettingenstraße 67, 80538 München, Germany
{mhofmann, jost}@informatik.uni-muenchen.de

2001

Abstract: We show how to efficiently obtain a priori bounds on the heap space consumption of first-order functional programs.
The analysis take space reuse by explicit deallocation into account and also furnishes an upper bound on the heap usage in the presence of garbage collection. It covers a wide variety of examples including, for instance, the familiar sorting algorithms for lists, including quicksort….

2003

Munich

Summer 2001, with Don Sannella and families

Summer 2002


Aigle

2006

Type-based amortised heap-space analysis

Martin Hofmann[1] and Steffen Jost[2]

[1] LMU München, Institut für Informatik
[2] University of St Andrews, School of Computer Science

Abstract: We present a type system for a compile-time analysis of heap-space requirements of Java style object-oriented programs with explicit deallocation.
Our system is based on an amortised complexity analysis: the data is arbitrarily assigned a potential related to its size and layout; allocations must be “payed for” from this potential. The potential of each input then furnishes an upper bound on the heap space usage for the computation on this input.
We successfully treat inheritance, downcast, update and aliasing. Example applications for the analysis include destination-passing style and doubly-linked lists. Type inference is explicitly not included; the contribution lies in the system itself and the nontrivial soundness theorem.

Reading, Writing and Relations

Towards Extensional Semantics for Effect Analyses

Nick Benton[1], Andrew Kennedy[1], Martin Hofmann[2], and Lennart Beringer[2]

[1] Microsoft Research, Cambridge
[2] Ludwig-Maximilians-Universität, München

Abstract. We give an elementary semantics to an effect system, tracking read and write effects by using relations over a standard extensional semantics for the original language. The semantics establishes the soundness of both the analysis and its use in effect-based program transformations.

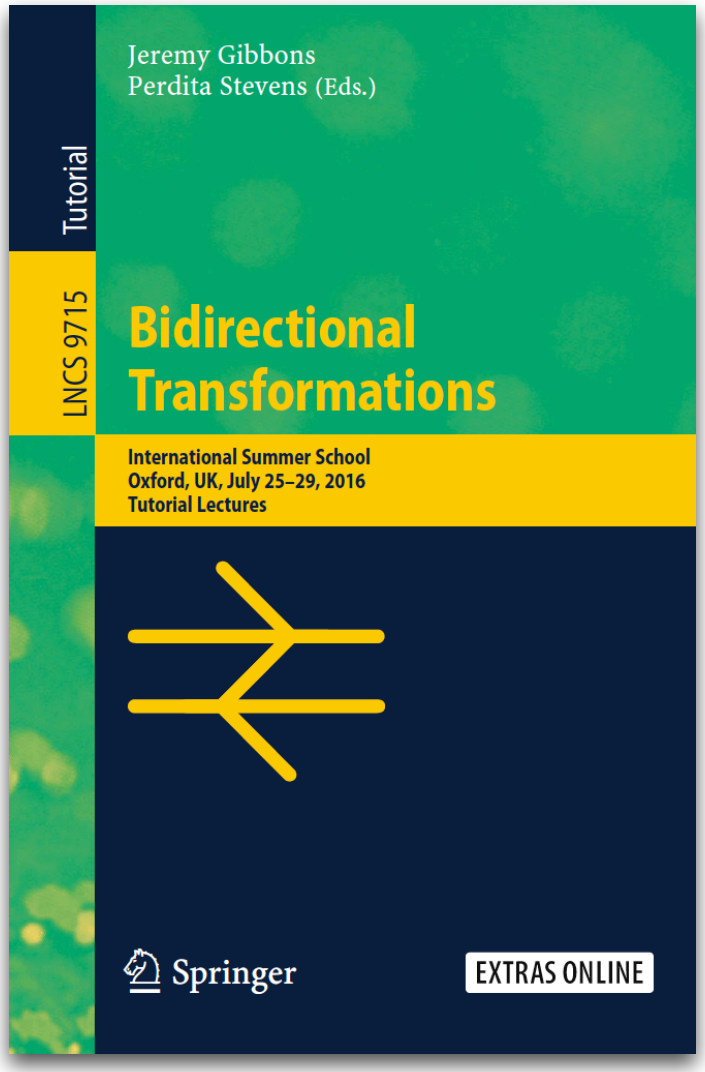
Symmetric Lenses

Martin Hofmann
Ludwig-Maximilians-Universität

Benjamin Pierce
University of Pennsylvania

Daniel Wagner
University of Pennsylvania

Abstract: *Lenses*—bidirectional transformations between pairs of connected structures—have been extensively studied and are beginning to find their way into industrial practice. … We offer two contributions to the theory of lenses. First, we present a new symmetric formulation, based on complements, an old idea from the database literature. This formulation generalizes the familiar structure of asymmetric lenses, and it admits a good notion of composition. Second, we explore the algebraic structure of the space of symmetric lenses…



Modular Edit Lenses

Martin Hofmann†

LMU Munich, Munich, Germany

Abstract. This article is a reading guide to the theory of symmetric edit lenses by Pierce, Wagner, and the author, which form a general framework for the modular construction of bidirectional synchronizers and which generalize the popular lenses framework by Foster and Pierce to a truly symmetric, bidirectional setting.

The article describes both the state-based and the edit-based version, as well as an extended example instantiation involving tree-structured data. The main focus is on edit lenses and the categorical combinators which allow for their modular construction. The article is based on three original research papers [9–11, 22] and summarises these in a concise form but does not contain new scientific material.

Brilliance

Brilliance

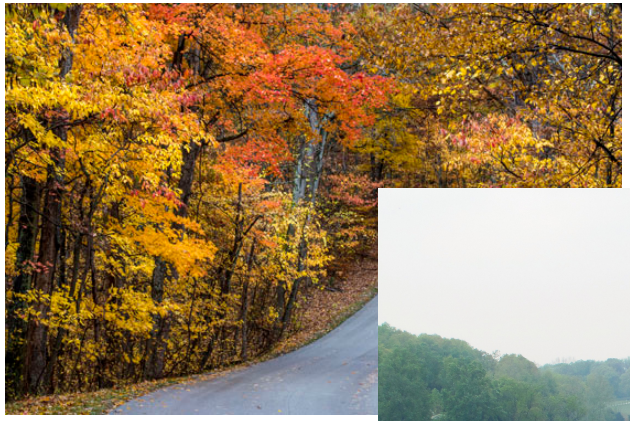
Warmth

Brilliance

Warmth

Fearlessness

Rural Indiana



Japan

Shonan Village Center

Mount Nikko Shirane


Deutsche Grammophon
STEREO 437 093-2 G H
DIGITAL RECORDING
Anne-Sophie Mutter
Berg · Violinkonzert · Violin Concerto
Rihm · »Gesungene Zeit · Time Chant«
Chicago Symphony Orchestra · James Levine
NUMERIQUE