

Curriculum Vitae

Derek Dreyer

Personal Information

Citizenship:	U.S.A.	Office Address:	MPI-SWS, Campus E1.4
Home Address:	Lessingstrasse 22		66123 Saarbruecken
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Academic Background

Carnegie Mellon University

Ph.D. in Computer Science, May 2005. 1997–2004

New York University

Graduate student in Computer Science. 1996–1997

B.A. in Mathematics and Computer Science, Summa Cum Laude. 1993–1996

Research Experience

Max Planck Institute for Software Systems (MPI-SWS)

Independent researcher (tenure-track faculty),
heading the Type Systems and Functional Programming group. 2008–present

Toyota Technological Institute at Chicago (TTI-C)

Research assistant professor (3-year independent postdoc). 2005–2007

Carnegie Mellon University, Department of Computer Science

Doctoral research. 2000–2004

Thesis: Understanding and Evolving the ML Module System.

Advisors: Robert Harper, Karl Crary.

Committee: Robert Harper, Karl Crary, Peter Lee, David MacQueen.

Bell Laboratories, Lucent Technologies (Murray Hill, NJ)

Summer internship. 1999

Project: Optimizing Power Usage for the TI C6x Chip.

Advisors: Nevin Heintze and Tor Jeremiassen.

New York University, Department of Computer Science

Undergraduate and graduate research. 1995–1996

Project: Developing Polynomial-Time Heuristics for the Steiner Tree Problem.

Advisor: Michael Overton.

Professional Activities

Program chair:

- 2011 ACM SIGPLAN Workshop on Types in Language Design and Implementation (**TLDI 2011**).
- 2007 ACM SIGPLAN Workshop on ML (**ML 2007**).

Program committee (PC) member:

- 2013 European Symposium on Programming (**ESOP 2013**).
- 2012 International Conference on Compiler Construction (**CC 2012**).
- 2011 ACM SIGPLAN-SIGACT Symposium on Principles of Programming Languages (**POPL 2011**).
- 2010 ACM SIGPLAN International Workshop on Foundations of Object-Oriented Languages (**FOOL 2010**).
- 2010 International Workshop on Modules and Libraries for Proof Assistants (**MLPA 2010**).
- 2009 International Workshop on Modules and Libraries for Proof Assistants (**MLPA 2009**).
- 2009 Conference on the Mathematical Foundations of Programming Semantics (**MFPS 2009**).
- 2008 ACM SIGPLAN International Conference on Functional Programming (**ICFP 2008**).
- 2007 ACM SIGPLAN Haskell Workshop (**Haskell 2007**).
- 2007 ACM SIGPLAN International Workshop on Foundations and Developments of Object-Oriented Languages (**FOOL/WOOD 2007**).
- 2006 ACM SIGPLAN Workshop on ML (**ML 2006**).

External review committee (ERC) member:

- 2013 ACM SIGPLAN-SIGACT Symposium on Principles of Programming Languages (**POPL 2013**).
- 2012 ACM SIGPLAN-SIGACT Symposium on Principles of Programming Languages (**POPL 2012**).
- 2009 ACM SIGPLAN Conference on Programming Language Design and Implementation (**PLDI 2009**).

Steering committee (SC) member:

- ACM SIGPLAN Workshop on Types in Language Design and Implementation (**TLDI**), 2011–present.
- ACM SIGPLAN Workshop on ML, 2008–2010.

Workshops co-chair, 2010-11 ACM SIGPLAN International Conference on Functional Programming (**ICFP 2010-11**).

Invited speaker, 2008 Conference on the Mathematical Foundations of Programming Semantics (**MFPS 2008**).

Invited participant, 2010 Dagstuhl Seminar on Modelling, Controlling and Reasoning About State.

Invited participant, IFIP Working Group 2.8 on Functional Programming (July 2007, February 2012).

Moderator, TYPES and TYPES/announce e-mail forums, April 2009–present.

Senior member, ACM SIGPLAN (Special Interest Group on Programming Languages).

Frequent external reviewer for a number of major conferences and journals, including POPL, ICFP, LICS, PLDI, TOPLAS, JFP, HOSC, TCS, ESOP, ECOOP, OOPSLA, CSL, PPDP, FLOPS, and APLAS.

Publications

Journal Publications

Non-Parametric Parametricity.

Georg Neis, Derek Dreyer, Andreas Rossberg.
Journal of Functional Programming (JFP). 21(4&5): 497–562, September 2011.
Special issue devoted to selected papers from ICFP 2009.

Logical Step-Indexed Logical Relations.

Derek Dreyer, Amal Ahmed, Lars Birkedal.
Logical Methods in Computer Science (LMCS). 7(2:16): 1–37, June 2011.
Special issue devoted to selected papers from LICS 2009.

Recursive Type Generativity.

Derek Dreyer.
Journal of Functional Programming (JFP). 17(4&5): 433–471, July & September 2007.
Special issue devoted to selected papers from ICFP 2005.

Conference and Workshop Publications

The Marriage of Bisimulations and Kripke Logical Relations.

Chung-Kil Hur, Derek Dreyer, Georg Neis, Viktor Vafeiadis.
In 2012 ACM SIGPLAN-SIGACT Symposium on Principles of Programming Languages (POPL 2012).

How to Make Ad Hoc Proof Automation Less Ad Hoc.

Georges Gonthier, Beta Ziliani, Aleksandar Nanevski, Derek Dreyer.
In 2011 ACM SIGPLAN International Conference on Functional Programming (ICFP 2011).

Separation Logic in the Presence of Garbage Collection.

Chung-Kil Hur, Derek Dreyer, Viktor Vafeiadis.
In 2011 IEEE Symposium on Logic in Computer Science (LICS 2011).

A Kripke Logical Relation Between ML and Assembly.

Chung-Kil Hur, Derek Dreyer.
In 2011 ACM SIGPLAN-SIGACT Symposium on Principles of Programming Languages (POPL 2011).

The Impact of Higher-Order State and Control Effects on Local Relational Reasoning.

Derek Dreyer, Georg Neis, Lars Birkedal.
In 2010 ACM SIGPLAN International Conference on Functional Programming (ICFP 2010).
This paper was nominated by ACM SIGPLAN for a **CACM Research Highlight**.

F-ing Modules.

Andreas Rossberg, Claudio V. Russo, Derek Dreyer.
In 2010 ACM SIGPLAN Workshop on Types in Language Design and Implementation (TLDI 2010).

A Relational Modal Logic for Higher-Order Stateful ADTs.

Derek Dreyer, Georg Neis, Andreas Rossberg, Lars Birkedal.
In 2010 ACM SIGPLAN-SIGACT Symposium on Principles of Programming Languages (POPL 2010).

Non-Parametric Parametricity.

Georg Neis, Derek Dreyer, Andreas Rossberg.
In 2009 ACM SIGPLAN International Conference on Functional Programming (ICFP 2009).

Logical Step-Indexed Logical Relations.

Derek Dreyer, Amal Ahmed, Lars Birkedal.
In 2009 IEEE Symposium on Logic in Computer Science (LICS 2009).

State-Dependent Representation Independence.

Amal Ahmed, Derek Dreyer, Andreas Rossberg.

In 2009 ACM SIGPLAN-SIGACT Symposium on Principles of Programming Languages (POPL 2009).

Mixin' Up the ML Module System.

Derek Dreyer, Andreas Rossberg.

In 2008 ACM SIGPLAN International Conference on Functional Programming (ICFP 2008).

A Type System for Recursive Modules.

Derek Dreyer.

In 2007 ACM SIGPLAN International Conference on Functional Programming (ICFP 2007).

Principal Type Schemes for Modular Programs.

Derek Dreyer, Matthias Blume.

In 2007 European Symposium on Programming (ESOP 2007).

Modular Type Classes.

Derek Dreyer, Robert Harper, Manuel M.T. Chakravarty.

In 2007 ACM SIGPLAN-SIGACT Symposium on Principles of Programming Languages (POPL 2007).

Recursive Type Generativity.

Derek Dreyer.

In 2005 ACM SIGPLAN International Conference on Functional Programming (ICFP 2005).

A Type System for Well-Founded Recursion.

Derek Dreyer.

In 2004 ACM SIGPLAN-SIGACT Symposium on Principles of Programming Languages (POPL 2004).

A Type System for Higher-Order Modules.

Derek Dreyer, Karl Crary, Robert Harper.

In 2003 ACM SIGPLAN-SIGACT Symposium on Principles of Programming Languages (POPL 2003).

Typed Compilation of Recursive Datatypes.

Joseph C. Vanderwaart, Derek Dreyer, Leaf Petersen, Karl Crary, Robert Harper, Perry Cheng.

In 2003 ACM SIGPLAN Workshop on Types in Language Design and Implementation (TLDI 2003).

Ph.D. Thesis

Understanding and Evolving the ML Module System.

Derek Dreyer.

Ph.D. Thesis, Carnegie Mellon University Technical Report CMU-CS-05-131, May 2005.

Other Papers

Practical Type Theory for Recursive Modules.

Derek Dreyer.

University of Chicago Computer Science Department Technical Report TR-2006-07, August 2006.

Toward a Practical Type Theory for Recursive Modules.

Derek R. Dreyer, Robert Harper, Karl Crary.

Carnegie Mellon University Technical Report CMU-CS-01-112, March 2001.

Two Heuristics for the Euclidean Steiner Tree Problem.

Derek R. Dreyer, Michael L. Overton.

Journal of Global Optimization. 13: 95–106, 1998.

Electronic copies of all of the papers cited above are available online at

<http://www.mpi-sws.org/~dreyer/research.html>.

Research Advisees

- **Chung-Kil Hur**, postdoc at MPI-SWS (since Oct. 2010).
- **Scott Kilpatrick**, doctoral student at MPI-SWS (since Aug. 2010).
- **Neel Krishnaswami**, postdoc at MPI-SWS (since Sep. 2011).
- **Georg Neis**, doctoral student at MPI-SWS (since Nov. 2008).
- **Andreas Rossberg**, postdoc at MPI-SWS (Aug. 2007–Jan. 2010, now at Google Munich).
- **Beta Ziliani**, doctoral student at MPI-SWS (since Jan. 2010).

Teaching Experience

Saarland University

Co-instructor and course designer Summer 2011

Graduate course: Concurrent Program Logics.

Course home page: <http://www.mpi-sws.org/~viktor/cpl/>.

Led an advanced graduate seminar, together with Viktor Vafeiadis, on Hoare-style logics for concurrent shared-memory programs.

Instructor and course designer Winter 2010-11

Graduate course: Type Systems for Modules.

Course home page: <http://www.mpi-sws.org/~skilpat/modsem/>.

Led an advanced graduate seminar on type systems for modular programming, focusing on the design and evolution of the ML module system.

Instructor and course designer Winter 2008-09

Graduate course: Typed Operational Reasoning.

Course home page: <http://www.mpi-sws.org/~dreyer/tor/>.

Taught a variant of the *Advanced Type Systems* graduate course that I had previously given in Winter 2006 at the University of Chicago (see below).

University of Chicago

Guest instructor Fall 2006

Graduate/undergraduate course: Programming Languages.

Lectured for two weeks on explicit and implicit variants of the polymorphic λ -calculus, and created two homework assignments on the material covered.

Instructor and course designer Winter 2006

Graduate course: Advanced Type Systems.

Course home page: <http://tti-c.org/dreyer/course/>.

Designed an original seminar course, in which the students learned how to apply the method of *logical relations* to prove a range of different theorems about program semantics (*e.g.*, strong normalization, decidability of typechecking, parametricity properties, and program equivalence). Lectured twice a week, and created and graded homework assignments.

Carnegie Mellon University

Teaching assistant Spring 1999

Undergraduate course: Programming Languages.

Instructor: Robert Harper.

Created and graded exams and homework assignments, and led weekly recitation sections.

Teaching assistant Spring 1998

Undergraduate course: Compiler Design.
Instructor: Peter Lee.
Created and graded exams and homework assignments.

New York University

Teaching assistant Spring 1997
Undergraduate course: Introduction to Computer Science II (Data Structures).
Instructor: Samuel Marateck.
Assisted students in the computing lab and via e-mail.

Instructor Fall 1996
Undergraduate course: Mathematical Thinking (Basic Mathematics).
Lectured three times a week, and created and graded exams and homework assignments.

Awards, Fellowships, and Scholarships

Max Planck Institute for Software Systems

Finalist, Microsoft Research Faculty Fellowship 2011

Carnegie Mellon University

National Defense Science and Engineering Graduate Fellowship 1997–2000

New York University

National Science Foundation Research Assistantship 1996

Morris Kline Award for Excellence in Mathematics 1996

University Honors Scholar – Founders Day Award 1996

Undergraduate Mathematics Tutoring Fellowship 1995–1996

Phi Beta Kappa 1995

University Scholar (Scholarship) 1993–1996

References

References available upon request.