

Curriculum Vitae of **Robert Pollack**

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Research Positions

Research Associate (01/11 –) Harvard University. Working in group of Prof. Greg Morrisett.

Senior Research Fellow (02/10 – 01/11) University of Edinburgh, U.K. Edinburgh site leader on EU funded project *CerCo*.

Research Associate (10/09 – 02/10) University of Edinburgh, U.K. Working on EPSRC funded Platform Grant EPE/005713/1.

Research Associate (12/05 – 10/09) University of Edinburgh, U.K. Working on EU funded project *Mobius*, IST-15905.

Research Associate (06/05 – 11/05) Royal Holloway, University of London, U.K. Working on EPSRC funded project GR/R84092.

Senior Research Fellow (12/02 – 10/04) University of Edinburgh, U.K. Working with John Longley on EPSRC funded project GR/N64571.

Senior Research Fellow (8/99 – 10/02) University of Durham, U.K. Working with Prof. Zhaohui Luo on EPSRC funded project GR/M75518.

Research Contract (2/99 – 6/99) with the Computing Science Institute, University of Nijmegen; working at University of Edinburgh.

Research Fellow (2/98 – 1/99) at Computing Science Dept., University of Glasgow, U.K.

Research Assistant Professor (2/97 – 1/98) at BRICS, Computer Science Dept., University of Aarhus, Denmark.

Research Contract (4/96 – 1/97) with the Computing Science Institute, University of Nijmegen.

Post-Doctoral Fellow (5/94 – 3/96) in the Programming Methodology Group, Dept. of Computing Science, Chalmers University of Technology, Göteborg, Sweden.

Research Associate (10/87 – 4/94) at the Laboratory for Foundations of Computer Science, University of Edinburgh, U.K.

Education

Ph.D., Computer Science (1994), University of Edinburgh, Scotland. Thesis supervisor: Rod Burstall; thesis title: *The Theory of LEGO: A Proof Checker for the Extended Calculus of Constructions*.

M.S., Mathematics (1977), Northeastern University, Boston, USA.

B.S., Mathematics (1972), Massachusetts Institute of Technology, USA.

Other studies: Univ. of Texas at Austin (1986–87); studied with Boyer and Moore. Part-time studies (while working) at Wang Institute of Software Engineering, Massachusetts (1983–85). Ph.D. student in mathematics (1972–74) at Univ. of Wisconsin, Madison.

Research Interests Theory and practice of mechanical proof checking; programming and reasoning with dependent types; specification and correctness of programs and algorithms; constructive type theory; formal mathematics. Long term interest in logical frameworks and reasoning about binding. Formal proof in LEGO, Coq, Isabelle/HOL, Abella, Twelf. Work on reasoning about SML programs

using Isabelle/HOL. Work on dependently typed records, and modules for dependently typed functional programming. Work on representing mathematics in type theory. Developed the LEGO proof development system, supporting proof by refinement in the Extended Calculus of Constructions and related logics. LEGO was widely used for teaching and research.

Teaching Experience Postgraduate courses in logic and type theory (Edinburgh Univ., 2004, 2002, 1993, 1992, 1991). M.Sc. course on logic and formal systems (Aarhus Univ., 1997). Postgraduate course on my own research (Chalmers Univ. of Technology, 1995). Undergraduate courses in elementary algebra, computer programming, and differential equations (Northeastern Univ, 1995, 1996, 1997).

Industrial Experience Programming and software engineering during much of 1969–86. Specialized in real-time systems such as industrial process control, communications and air traffic control. Consultant to the Transportation Systems Center of the U.S. Dep't. of Transportation. Chief software engineer of a startup company building process control computers. Vice-president and co-founder of a software consulting company.

Personal Joint U.S. and U.K. nationality.

Refereed publications Most available from <http://homepages.inf.ed.ac.uk/rpollack/>.

- A Canonical Locally Named Representation of Binding. (With Masahiko Sato and Wilmer Ricciotti) To appear in *Journal of Automated Reasoning*.
- External and Internal Syntax of the Lambda-calculus. (With Masahiko Sato.) In *Journal of Symbolic Computation* 45 (2010) pp. 598-616
- Engineering Formal Metatheory. (With Brian Aydemir, Arthur Charguéraud, Benjamin C. Pierce and Stephanie Weirich.) In *Principles of Programming Languages, POPL 2008*.
- A logical framework with dependently typed records. (With Thierry Coquand and Makoto Takeyama.) In *Fundamenta Informaticae*, 65(1–2), 2005.
- Reasoning about CBV functional programs in Isabelle/HOL. (With John Longley.) In *Theorem Proving in Higher Order Logics, TPHOLs 2004*. Springer-Verlag LNCS 3223.
- A logical framework with dependently typed records. (With Thierry Coquand and Makoto Takeyama.) In *Typed Lambda Calculus and Applications, TLCA 2003*. Springer-Verlag LNCS 2701.
- Dependently typed records in type theory. *Formal Aspects of Computing*, 13:386-402, 2002.
- A constructive algebraic hierarchy in Coq. (With Herman Geuvers, Freek Wiedijk and Jan Zwanenburg.) *Journal of Symbolic Computation.*, 34:271–286, 2002.
- Dependently typed records for representing mathematical structure. In *Theorem Proving in Higher Order Logics, TPHOLs 2000*. Springer-Verlag LNCS 1869.
- Some lambda calculus and type theory formalized. (With James McKinna.) *Journal of Automated Reasoning*, 23(3–4), Nov. 1999.

- How to believe a machine-checked proof. In *Twenty Five Years of Constructive Type Theory*, editors G. Sambin and J. Smith, Oxford University Press. Aug. 1998.
- A verified typechecker. In Dezani-Ciancaglini and Plotkin, editors, *Proceedings of the Second International Conference on Typed Lambda Calculi and Applications, TLCA'95, Edinburgh*. Springer-Verlag LNCS 902.
- On extensibility of proof checkers. In Dybjer, Nordström and Smith, editors, *Types for Proofs and Programs, TYPES'94, Båstad: Selected papers*. Springer-Verlag LNCS 996.
- Checking algorithms for Pure Type Systems. (With L. van Benthem Jutting and James McKinna.) In Barendregt and Nipkow, editors, *Types for Proofs and Programs, TYPES'93, Nijmegen: Selected papers*. Springer-Verlag LNCS 806.
- Closure under alpha-conversion. In Barendregt and Nipkow, editors, *Types for Proofs and Programs, TYPES'93, Nijmegen: Selected papers*. Springer-Verlag LNCS 806.
- Pure Type Systems formalized. (With James McKinna.) In Bezem and Groote, editors, *Proceedings of the International Conference on Typed Lambda Calculi and Applications, TLCA'93, Utrecht*. Springer-Verlag LNCS 664.
- Using typed lambda calculus to implement formal systems on a machine. (With Arnon Avron, Furio Honsell and Ian Mason.) *Journal of Automated Reasoning* 9:309–354, 1992.
- Type checking with universes. (With Robert Harper.) *Theoretical Computer Science* 89:107–136, 1991.
- Type checking, universe polymorphism, and typical ambiguity in the Calculus of Constructions. (With Robert Harper.) In *TAPSOFT'89, Barcelona*. Springer-Verlag LNCS 352.

Some other publications and talks Some available from <http://homepages.inf.ed.ac.uk/rpollack/>.

- A Canonical Locally Named Representation of Binding. (With Masahiko Sato.) In Workshop on Mechanized Metatheory (WMM 2009), colocated with ICFP 2009.
- External and Internal Syntax of the Lambda-calculus. (With Masahiko Sato.) In Workshop on Theory and Applications of Abstraction, Substitution and Naming (TAASN 2009), colocated with ETAPS 2009.
- Strong Induction Principles in the Locally Nameless Representation of Binders. With Christian Urban in *2nd ACM SIGPLAN Workshop on Mechanizing Metatheory*, colocated with ICFP 2007.
- Invited talk *Local Representations of Binding* at Workshop on Logical Frameworks and Meta-Languages: Theory and Practice (LFMTP) 2007.
- *Types for Proofs and Programs, International Workshop, TYPES 2000*. (Edited with Callaghan, Luo and McKinna.) Springer LNCS 2277.

- The algebraic hierarchy of the FTA project. (With Herman Geuvers, Freek Wiedijk and Jan Zwanenburg.) In *Proceedings of Calculemus 2001*.
- Dependently typed records for representing mathematical Structure. In *Workshop on Subtyping and Dependent Types in Programming, DTP'2000*. INRIA Technical Report.
- *Informal Proceedings of the Joint CLICS–TYPES Workshop on Categories and Type Theory*. (Edited with Peter Dybjer.) Report 85, Programming Methodology Group, Göteborgs University and Chalmers University of Technology, Göteborg, Sweden. May 1995.
- Polishing up the Tait–Martin–Löf proof of the Church–Rosser theorem. In *Proceedings of De Wintermöte '95*, Department of Computing Science, Chalmers University of Technology, Göteborg, Sweden, Jan. 1995.
- Are tactics feasible? In *CADE-12 Workshop on Correctness and Metatheoretic Extensibility of Automated Reasoning Systems*, Nancy, 1994.
- *The Theory of LEGO: A Proof Checker for the Extended Calculus of Constructions*. Ph.D. thesis, University of Edinburgh, 1994.
- *LEGO Proof Development System: User's Manual*. (With Zhaohui Luo.) LFCS Technical Report ECS-LFCS-92-211, 1992.

Other professional activities

- Program committees of *Workshop on Proof Search in Type Theories (PSTT'09)* and *Modules and Libraries for Proof Assistants (MLPA'09)* (both to be co-located with CADE'09, Montreal).
- Program committee of *Theorem proving in Higher Order Logics (TPHOLs) 2009*, Munich.
- Steering committee of EU Coordination Action 510996 (TYPES). Active in proposal and management of 4 previous European TYPES Actions.
- Program committee of *Workshop on Logical Frameworks and Meta-Languages: Theory and Practice (LFMTP'08)*.
- Program committee of *Workshop on Mechanizing Metatheory 2007*, co-located with ICFP.
- Organizer of EU-funded TYPES *Workshop on Math Wikis*, Oct. 2007.
- Program committee of *Types in Language Design and Implementation (TLDI) 2007*.
- Program committee of *Programming Languages meets Program Verification (PLPV) 2006*.
- Program committee of *Mathematically Structured Functional Programming (MSFP) 2006*.
- Co-organizer of by-invitation workshop *Binding Challenges* at JAIST (Kanazawa, Japan), Apr. 2005.
- Steering committee of *MEchanized Reasoning about Languages with varIable biNding (MERLIN)*.
- Program committee chair for MERLIN 2005.

Referees

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