Paolo Torrini - Curriculum Vitæ

Outline

Main qualifications

- 2003: PhD, thesis "Qualitative Spatial Reasoning with Super-Intuitionistic Logics", School of Computing, University of Leeds (England).
- 1999: MSc in Artificial Intelligence, thesis "Verifying SRT Division Hardware Using HOL90/CLaM2.7", School of AI, University of Edinburgh (Scotland).
- 1995: Degree in Philosophy, thesis "Logiche Rilevanti: Sintassi e Semantica", University of Florence (Italy).

Research work

- 2008 Apr – present: research associate at the Department of Computer Science, University of Leicester (UK)

  `http://www.cs.le.ac.uk/people/pt95/`

- 2006 Apr – 2007 Nov: researcher in the Synchrone Group at Laboratoire Verimag in Grenoble (France)

  `www-verimag.imag.fr/SYNCHRONE`

- 2003 May – 2005 Oct: researcher in Bernd Krieg-Brueckner's Group at the Informatics Department of the University of Bremen (Germany)

  `www.informatik.uni-bremen.de/agbkb`

Research interests

In the following areas: verification, logic, semantics, theorem proving, graph transformation, stochastic simulation

Programming experience

Mainly with Java, Haskell and Prolog, to a minor extent with SML, C and Lisp.

Details

Research work experience

- 2008 Apr – 2010 Mar: I have been working as research associate of Reiko Heckel (for references [RH]) at the Department of Computer Science of the University of Leicester, funded by the EU project SENSORIA [SE].
  - I have been developing an implementation of stochastic simulation [GRA] based on graph transformation (publications [FASE,GTDS,NF,GTVMT])
  - I have been working on an encoding of graph transformation in intuitionistic linear logic (publications [ICE,LIN])
  - I have been contributing to a deliverable [SD] and with presentations
- 2006 Apr – 2007 Nov: I worked as a research assistant at Laboratoire Verimag in Grenoble, in the Synchrone Group, funded by the project PROOFER [PR] lead by Paul Caspi. The project involved
  - collaboration with Prover Technology, Thales (former Alcatel) and RATP for the verification of the safety of railway interlocking systems (deliverables [PD1,PD2])
  - formalising fault trees (technical report [VER]) and implementing the formalisation (implementations [VFT,FTA])
- 2003 May – 2005 Oct: I worked as a research assistant in the group of Bernd Krieg-Brueckner, area "Formal Methods for Software Development", Department of Mathematics and Informatics, University of Bremen (Universitaet Bremen).
  - 2004 Nov – 2005 Oct: I was funded by from the University of Bremen [UB1,UB2] to work on design and implementation of translations of Haskell programs to the Isabelle logics HOL and HOLCF. The implementation [HET] has been carried out as part of the development of the Heterogeneous Tool Set for formal specification, lead by Till Mossakowski (for references [TM], publications [TPHB,ISA])
  - 2003 May – 2004 Oct: I was funded by a project on the verification of robotics software [SR] lead by Christoph Lueth. I worked on the requirement specification of robotics software using Isabelle as an interactive theorem prover [ARD,ARP]

Software development

- (GRA) GraSS — stochastic simulation based on graph transformation, as part of VIATRA (eclipse plugin) — implemented in Java, documented in [FASE], involving a collaboration with SENSORIA partner Budapest University of Technology and Economics, currently used for a PhD student project in network modelling and simulation [GTDS]
- Fault tree analysis tools downloadable at `http://www.cs.le.ac.uk/people/pt95/`. (VFT) VeriFT — documented in [VTR], implemented in Haskell and Java, supports drawing and analysis of fault trees, using uDrawGraph as graphical interface.

(FTA) FTA (implemented in Java) extends the analysis of a pre-existing fault-tree tool called Moby-FT

- (HET) The translations from Haskell to Isabelle-HOLCF (documented in [TPHB]) and HOL-AWE (documented in [ISA]), as part of HetCASL `hets/index_e.htm` — implemented in Haskell, using Programatica
- Specification of a control system and theorem proving in Isabelle-HOL (for the Safe Robotics project [SR]), documented in [ARD]
- Formalisation of a spatial logic and theorem proving in Isabelle-HOL (PhD thesis [PHDT])
- Verification of SRT division in HOL90-Clam based on a hardware simulation implemented in SML (MSc thesis [MSC2])

Teaching experience

- I taught the Logic Programming course (CO2014) in the second semester of 2008-09 at the University of Leicester. The course lasted 8 weeks, with twice 1-hour lectures per week plus lab classes.
- Between Jan 2000 and Jun 2001 I worked as teaching assistant at the School of Computing (Prolog, SML, AI module).
- Between 1996 and 1998 I worked in education, teaching logic at several secondary schools in Florence. I taught C at a private computer school and did more teaching work at various language schools.

Publications and manuscripts

Refereed conference and workshop papers

- (ITP) "Linear Types for Graph Transformation" Paolo Torrini, Reiko Heckel. Submitted to ITP 2010
- (GTVMT) "Stochastic Graph Transformation with Regions" Paolo Torrini, Reiko Heckel, Istvan Rath. Accepted at GT-VMT 2010
- (FASE) "Stochastic Modelling and Simulation of Mobile Systems" Paolo Torrini, Reiko Heckel, Istvan Rath. Accepted at FASE 2010.
- (LIN) "Resource-bound Quantification for Graph Transformation" Paolo Torrini, Reiko Heckel. presented at the LINEARITY Workshop (satellite of CSL), accepted for post-proceedings, pp 1-12, 2009
- (ICE) "Towards an Embedding of Graph Transformation in Intuitionistic Linear Logic" Paolo Torrini, Reiko Heckel. ICE Workshop (satellite of CONCUR), pp 1-18, 2009
- (GTDS) "Model-based Simulation of VoIP Network Reconfigurations using Graph Transformation Systems" Ajab Khan, Paolo Torrini, Reiko Heckel. Proceedings of ICGT'08 - Doctoral Symposium, pp 1-20, 2009
- (QSIC) "A First Step towards Formal Verification of Security Policy Properties for RBAC" Michael Drouineaud, Maksym Bortin, Paolo Torrini, Karsten Sohr. Proceedings of QSIC-2004, IEEE Publications, pp 60-67, 2004
- (ECAI) "A Foundation for Region-based Qualitative Geometry" Brandon Bennett, Anthony G. Cohn, Paolo Torrini, Shyamanta Hazarika. Proceedings of the 14th European Conference on Artificial Intelligence (ECAI-2000, Berlin), edited by W. Horn, pp 204-208, 2000
- (AAAI) "Describing Rigid Body Motions in a Qualitative Theory of Spatial Regions" Brandon Bennett, Anthony G. Cohn, Paolo Torrini, Shyamanta Hazarika. Proceedings of the 16th National Conference on Artificial Intelligence (AAAI-2000, Austin), edited by Henry A. Kautz and Bruce Porter, pp 503-509, 2000

Journal papers and book chapters

- (SB) "Advances in Model Transformation by Graph Transformation: Specification, Execution and Analysis" Gabor Bergmann, Artur Boronat, Reiko Heckel, Paolo Torrini, Istvan Rath, Daniel Varro. Book chapter, in preparation
- (NF) "Stochastic Modelling and Simulation of Mobile Systems" Paolo Torrini, Reiko Heckel. Book chapter, in preparation
- (ANCL) "Mereotopology in 2nd-Order and Modal Extensions of Intuitionistic Propositional Logic" Paolo Torrini, John G. Stell, Brandon Bennett. Journal of Applied Non-Classical Logics, vol.12, n. 3-4, 2002

Other workshop papers and technical reports

- (VTR) "From fault-trees to safety conditions" Paul Caspi, Paolo Torrini, Pascal Raymond. Verimag, 2007
- (TPHB) "Translating Haskell to Isabelle" Paolo Torrini, Christoph Lueth, Christian Maeder, Till Mossakowski. TPHOL — Emerging Trends, 2007
- (ISA) "Translating from Haskell to Isabelle" Paolo Torrini, Christoph Lueth, Christian Maeder, Till Mossakowski. Isabelle Workshop, 2007
- (LTR2) "Connectedness in Alexandroff Spaces with Intuitionistic 2nd-order Propositional Logic" Paolo Torrini. University of Leeds, School of Computing, Research Report Series, 2001
- (LTR1) "Region-based Qualitative Geometry" Brandon Bennett, Anthony G. Cohn, Paolo Torrini, Shyamanta Hazarika. University of Leeds, School of Computing, Research Report Series, 2000

Extended abstracts

- (AR3) "Logical Representation for Route Graphs" extended abstract. Paolo Torrini. Automated Reasoning Workshop, 2004
- (AR2) "Embedding a Quantified Logic for Spatial Reasoning in Isabelle-HOL" extended abstract. Paolo Torrini, Jacques D. Fleuriot, John G. Stell, Brandon Bennett. Automated Reasoning Workshop, 2002
- (AR1) "Qualitative Spatial Reasoning with Intuitionistic Logic" extended abstract. Paolo Torrini. Automated Reasoning Workshop, 2001

Deliverables

- (DS) "Formal Analysis of Model Transformation" Denes Bisztray, Reiko Heckel, Paolo Torrini *et al.*, SENSORIA D7.1.b, 2008
- (DP2) "Demonstration de la securite' d'une application ferroviaire de signalisation en mode nominal et en modes degrades par la preuve formelle — Rapport intemediaire" S. Behnia, P. Chrtier, C. Brion, P. Monetta, N. Breton, P. Caspi, P. Raymond, P. Torrini. RATP, Alcatel, Prover Technology, Verimag, 2007
- (DP1) "Verification d'une approche de model-checking globale d'un poste de manouvre informatise' — Rapport final" Paul Caspi, Erwan Jahier, Pascal Raymond, Paolo Torrini, Stavros Tripakis. Verimag, 2006

Project proposals and unpublished manuscripts

- (B2) "Constructive logic for biochemical systems — Project proposal" November 2008
- (HID) "Translating Haskell to Isabelle — Documentation" July 2007
- (B1) "Formal development of biocomputations — Project proposal" February 2006
- (ARP) "Abstract robotics — Project proposal" August 2004
- (ARD) "High-level verification of a safety module — Isar documentation" March 2005

Dissertations

- (PHDT) Qualitative Spatial Reasoning with Super-Intuitionistic Logics, PhD Thesis, University of Leeds, January 2004
- (MSC2) Verifying SRT Division Hardware Using HOL90/CLaM2.7, MSc Thesis, School of AI, University of Edinburgh, September 1999
- (MSC1) Logiche Rilevanti: Sintassi e Semantica, Tesi di Laurea, Universita' di Firenze, February 1996

Projects, talks, schools, other skills

Projects

- (SE) "SENSORIA" EU project. Funded my position at the University of Leicester, Apr 2008 – present (contrat ends Mar 2010)
- (PR) "Proofer" PREDIT project — a collaboration between Verimag, Prover Technology, Alcatel and RATP. Funded my position at Verimag, Apr 2006 – November 2007
- (BU1) "Translating P-logic to Isabelle-HOLCF" Universitaet Bremen. July – October 2005
- (BU2) "Translating CASkell to Isabelle-HOLCF" Universitaet Bremen. November 2004 – June 2005
- (SR) "Safe Robotics" DFK-Project 2001 – 2004. Funded my position in Bremen, May 2003 – October 2004
- (VUG) "Managing Vagueness, Uncertainty and Granularity in Spatial Information Systems" EPSRC GR/M56807. Funded my PhD in Leeds, 1999 – 2002

Seminars talks

- 2009: Logic and Graph Transformation (meeting) — University of Leicester
- 2009: SENSORIA meeting (Lisbon)
- 2009: Model transformation seminar — University of Leicester
- 2008: External seminar — University of Leicester
- 2007: Proofer meetings (Paris)
- 2003 – 04: Formal Methods Group seminar — Informatik, Universitaet Bremen
- 2003: Theory and Application of Relational Structures as Knowledge Instruments (TARSKI) Workshop, University of Leeds
- 2002: CLaM-INKA-OMRS (CIAO) Workshop, University of Edinburgh
- 2001 – 02: Mathematical Reasoning Group seminar — Informatics, University of Edinburgh
- 2001: Workshop on Vagueness, Uncertainty and Granularity in Spatial Information, Ilkley (Leeds)
- 2000 – 01: Research students seminar — School of Computing, University of Leeds
- Other workshops listed in the bibiography

Schools, courses

- TYPES 2005 – Typing systems and theorem proving, Chalmers University (Sweden)
- Compiler Optimisation 2005, University of Copenhagen (Denmark)
- Specification Languages 2004 (Slovakia)
- EEF 2001 – Theorem proving, BRICS (Denmark)
- ESSLLI 2000, University of Birmingham (UK)
- 2001: Geographic Information Systems (University of Leeds)
- EEF 2000 – Deduction and theorem proving, University Heriot-Watt (UK)
- 2000: Geographic Data-bases (Laser-Scan, Cambridge)
- AILA 1997 – Linear logic (Cesena, Italy)
- 1997 – Programming in C (training course)

Languages and other skills

- Languages:
  - Italian (native)
  - English (fluent)
  - German, French (intermediate)
  - Spanish (basic)
- Driving Licence: type B, from 1986.
- Non-professional: music (piano and guitar).