

Olivier HERMANT

CRI, MINES ParisTech – 35 r. St-Honoré – 77 305 Fontainebleau (France)

Tel : +33 1 64 69 48 31 Fax : +33 1 64 69 48 47

[name.surname\(a\)cri.mines-paristech.fr](mailto:olivier.hermant@cri.mines-paristech.fr)

EDUCATION

- Dec. 06, 2005 Ph.D. in [Computer Science](#), [Paris Diderot](#) University, France
Manuscript : “Méthodes sémantiques en déduction modulo” (Semantical methods in Deduction Modulo). Jury : G. Dowek (advisor), T. Coquand and M. Okada (reviewers), J. Goubault-Larrecq, D. Kesner, T. Hardin and J. Lipton.
- Jul. 25, 2002 ENGINEER in [Computer Science](#), [Politecnico di Milano](#) University, Italy
Master’s work : “Dédution modulo et élimination des coupures : une approche syntaxique” (Deduction modulo and cut-elimination : a syntactical approach), advisor G. Dowek.
- Sept. 2002 ENGINEER, [ENSTA ParisTech](#), Paris, France

WORK AND TEACHING EXPERIENCE

- Sept. 01, 2015 / — TENURED RESEARCHER, [CRI, MINES ParisTech](#) (3-year engineering institute, M.Sc. level degree).
In addition to the duties below :
 - vice-chair of the Computer Science major,
 - 20 more hours of lectures in the CS Major (Python, Formal Methods, up to 10 students),
 - member of the Commission Consultative Paritaire (career committee).
- Sept. 01, 2015 / Jun. 30, 2016 VISITING PROFESSOR, Department of Mathematics and Computer Science, [Wesleyan University](#).
Teaching :
 - Introduction to Programming in Python (80h, 75 students)
 - Automated Theorem Proving (40h, 8 students)
- Sept. 01, 2012 / Aug. 31, 2015 ASSOCIATE RESEARCHER, CRI, MINES ParisTech. Teaching 80h per year :
 - Year 1 : Introduction to Programming : 48h, practical sessions and tutor (java : 20 students).
 - Year 2 : Foundations of Computer Science : 4h of lectures (natural deduction, arithmetic, undecidability, lambda-calculus and the Curry-Howard correspondence : 10 students).
 - Other :
 - semantic cut elimination methods (*(in English)*) : 3h of lecture 2nd year, MPRI M.Sc.);
 - Formal Approaches : (25h, ISEP, see below);
 - executive MBA thesis tutoring (Information System Management).
- Sept. 01, 2008 / Aug. 31, 2012 TENURED ASSOCIATE PROFESSOR, [ISEP](#) (same kind of institute as MINES ParisTech). Teaching 280 hours per year :
 - Year 1 :
 - Introduction to Programming in C, then java : 60h, full organization (lectures, practical sessions, project : 200 students);
 - Team Project : 2*80h, tutor of two groups (PHP, MySQL AJAX, UML : 26 students per group, 160h of sessions, half of them tutored)
 - Year 2 :
 - Formal Approaches (*(in English)*) : 25h, full organization (logic, Coq, Frama-C : 20 students);
 - Object-Oriented Programming : 25h, practical sessions (java : 26 students).
 - Programming Contest : 28h, practical sessions (algorithmics, 15 students)
 - Year 3 :
 - Algorithmics (*(in English)*), 10h (operations research and complexity : 30 students);
 - Formal Approaches (same as Year 2).
 - Other : semantic cut elimination methods (*(in English)*), 3h of lecture 2nd year, MPRI M.Sc.)
 - Administrative duties : head of the Computer Science Major, member of internal committees and of ISEP’s board of directors.

- Sept. 01, 2007 / POST-DOCTORAL fellow, [Complutense de Madrid](#) and [Politecnica de Madrid](#) Universities, Spain.
 Aug. 31, 2008 M.Sc. lecture : the tableaux method.
- Sept. 01, 2006 / ASSISTANT PROFESSOR (full time) in [Computer Science](#), Paris Diderot University, France. Teaching
 Aug. 31, 2007 200h of practical sessions :
 — 1st year of B.Sc. :
 — Introduction to Programming : 50h (`java` : 30 students);
 — Introduction to Operation Systems : 40h (`shell` scripts : 30 students);
 — Object-Oriented Programming (`java`).
 — 3rd year of B.Sc. : logic, 40h (30 students).
 — 1st year of M.Sc. : System Programming, 50h (IPC in `C` (POSIX) : 25 students).
- Oct. 01, 2005 / ASSISTANT PROFESSOR (full time) in [Computer Science](#), Pierre et Marie Curie University, France.
 Aug. 31, 2006 Teachgin 200h of practical sessions :
 — 1st year of B.Sc. : introduction to programming languages : 60h (`scheme` : 30 students).
 — 2nd year of B.Sc. :
 — mathematical structures for computer science : 60h (orders, graphs, induction, ... : 30
 students);
 — programming project : 50h (first-order theorem prover in OCaml : 15 students).
 — 3rd year of B.Sc. : basics of computer science : 30h (typing, semantics of the `Cam1` language :
 20 students).
- Apr. / Jun. 2005 Teaching assistant, École polytechnique, Course INF 321 : 48h, pratical sessions (`java` : 20 advanced
 students)
- Oct. 01, 2003 / oral tests in mathematics (Level : 1st year of B. Sc.), 50h, Louis-le-Grand high school
 Jun. 30, 2004
- Mar. 01, 2001 / PROGRAMMER (part-time), Observing S.p.A., Mailand, Italy. Missions implying data bases and
 Feb. 28, 2002 internet protocols. Several programs of thousands of lines of code.
- Apr. / Jun. 2000 INTERNSHIP IN LABORATORY, LIX, École polytechnique, advisor Alain Plagne : Branch-and-bound
 algorithm for searching optimal sets (Sidon, B_2^2)

FOREIGN LANGUAGES

RUSSIAN	fluent, written and spoken
ENGLISH	fluent, written and spoken.
ITALIAN	proficient, written and spoken
SPANISH	basic, written and spoken
GERMAN	basic academical knowledge, written

STAYS ABROAD

- Aug. 19, 2015 / VISITING PROFESSOR, Wesleyan University, Middletown, CT, USA.
 Jun. 30, 2016
- Nov. 27, 2014 / INVITED PROFESSOR, Natal University (UFRN), Natal, Brazil. Guest : Pr. Richard Bonichon
 Dec. 10, 2014
- Feb. 07, 2008 / INVITED RESEARCH FELLOW, Wesleyan University, Connecticut. Guest : Pr. James Lipton.
 Mar. 07, 2008
- Nov. 27, 2007 / INVITED at Wesleyan University, Connecticut. Guest : Pr. James Lipton.
 Dec. 09, 2007
- Dec. 03, 2006 / INVITED at Wesleyan University, Connecticut. Guest : Pr. James Lipton.
 Dec. 13, 2006
- Jun. 13, 2006 / POST-DOCTORAL FELLOWSHIP FROM JSPS/CNRS. Keio University, Japan. Guest : Pr. Mitsuhiro
 Aug. 23, 2006 Okada.
- Jun. 04, 2006 / INVITED at Politecnica de Madrid University, Spain. Guest : Pr. James Lipton.
 Jun. 08, 2006
- 2000 / 2002 ERASMUS/SOCRATES FELLOWSHIP. ENSTA ParisTech and Politecnico di Milano exchange student.

IMPLICATION IN THE COMMUNITY

2016	PC member of LFMTP
2015	reviewer and pre-reviewer, ANR 2015 and 2016 campaigns
2014	PC member of the 25th RTA–12th TLCA joint conference at Vienna Summer of Logic. Co-organizer of the HPCC 2014 conference in Paris.
2012-2015	Responsible of the Deducteam seminar.
2011-2012	Member of the advisory board of ISEP.

PH.D. AND POST-DOCTORAL SUPERVISION

Nov. 2014-Aug. 2015	A. Spiwack, post-doctoral fellow : type reconstruction and a basic tactic language for Dedukti.
since Mar. 2013	Pierre Halmagrand (co-supervisor), intern and then Ph.D. student : automated theorem proving for theories, using rewriting modulo
Oct. 2012/ Oct. 2015	Ronan Saillard, Ph.D. student : Dedukti, a Universal proof assistant based on $\lambda\Pi$ -calculus modulo.
Oct. 2012/Feb. 2015	Vivien Maisonneuve (co-supervisor), Ph.D. student : stability proofs for control systems and automatic invariant computation with abstract interpretation. Defended on Feb. 6, 2015 : <i>Static Analysis of Control-Command Systems : Floating-Point and Integer Invariants</i> .
Sep. 2010/Sep. 2013	Giang Le Truong (co-supervisor for 30%), Ph.D. student : development of the INI programming language, syntax, typing, semantics and model checking. Defended on Sep. 30, 2013 : <i>Using Event-Based and Rule-Based Paradigms to Develop Context-Aware Reactive Applications</i>

- Mar. 2015 / Aug. 2015 Gaëtan Gilbert, Master's thesis : type inference in the $\lambda\Pi$ -calculus modulo. Co-supervised with A. Spiwack.
- Feb. 2014 / Jun. 2014 Gaëtan Gilbert, Master's thesis : extraction of cut-free proofs from constructive strong completeness proofs for various logics. Links with normalization by evaluation.
- Mar. 2013 / Aug. 2013 Nelson Lossing, Master's thesis : Semantic analysis of arrays, structures and pointers.
- Mar. 2012 / Aug. 2012 Quentin Carbonneaux, Master's thesis : Compilation JIT des termes de preuve.
- Jun. 2012/Jul. 2012 Dmitry Fedosov (SUAI, Russia), master's project : piloting a robot with INI to follow a red ball.
- Apr. 2012/May 2012 Thanyatorn Parapuntakul (SIIT, Thailand) B. Sc. internship : Development in Haskell, Defunctionalization and Compilation.
- Mar. / Jun. 2012 G. Dadaglo, J.-B. Rozier and M. Tison, 3rd Year research project : simulation of a Cloud architecture.
- Mar. / Jun. 2012 A. Cauchefer and G. Bidan, 3rd Year research project : implementation of multi-core nodes in a Cloud simulator.
- Sep. 2011 / Jun. 2012 A. Uslu, research project : Cloud simulator.
- Oct. 2011 / Feb. 2012 Mélanie Boudard, 3rd Year research project : Improvements over Gentzen-Gödel negative translation.
- Oct. 2011 / Feb. 2012 Guillaume Boutmy, 3rd Year research project : type system of INI.
- Jun. / Jul. 2011 Ksenia Khramenkova (SUAI, Russia), master's project : refactorization of the cloud simulator and load balancing algorithms.
- Feb. / Jun. 2011 Godefroy de Compreignac and Ronan Letellier, introduction to research (2nd Year project) : automatic classification of documents with text mining algorithms.
- Apr. 2011 Jirapa Jenchaimahakoon (SIIT, Thailand), B. Sc. internship : Modelization of cache phenomenons in a Cloud Simulator.
- Oct. 2010 / Jan. 2011 Antoine Gibert and Quentin Tirroloni, 3rd year research project : Cloud Simulator.
- Jul. / Aug. 2010 Boris Sedov and Alexander Stepanov, master's project : defunctionalization of functional programs, and then simulator of a Cloud Computing network.
- Mar. / Jul. 2010 Aloïs Brunel, Master's thesis : "*Candidats de réductibilité quantitatifs et logique linéaire élémentaire modulo*" (Quantitative reducibility candidates and elementary linear logic modulo)
- Feb. / Jun. 2010 Martin Potier and Benjamin Riquet, introduction to research (2nd Year project) : functional programming languages and defunctionalization algorithm.
- Sep. / Dec. 2009 Martin Potier (co-supervisor for 20%), research internship : development of a first version of the INI programming language.

INTERNATIONAL JOURNALS

- S. Prabhu Kumar, S. Lefebvre, R. Chiky and O. Hermant, *LibRe : A better Consistency-Latency Tradeoff for Quorum based Replication Systems*, Advances in Knowledge Discovery and Management, 7, 2016, to appear.
- G. Dowek and O. Hermant, *A Simple Proof that Super-Consistency Implies Cut Elimination*, Notre-Dame Journal of Formal Logic, 53(4), 2012, pp. 439-456.
- O. Hermant, *Resolution is Cut-Free*, Journal of Automated Reasoning, 44(3), 2010, pp. 245-276.
- O. Hermant and J. Lipton, *Completeness and Cut Elimination in the Intuitionistic Church's Theory of Types - Part 2*, Journal of Logic and Computation, 20(2), pp. 597-602, Mars 2010.
- O. Hermant and J. Lipton, *Cut Elimination in the Intuitionistic Theory of Types with Axioms and Rewriting Cuts, Constructively*. In : C. Benzmüller, C. Brown, J. Siekmann and R. Stateman, eds., Festschrift in Honor of Peter B. Andrews on His 70th Birthday, Studies in Logic and the Foundations of Mathematics, IfCoLog, 2008.
- O. Hermant, *Skolemization in Various Intuitionistic Logics*. Archive for Mathematical Logic, Springer, 2008. To appear.

INTERNATIONAL CONFERENCES with steering committee

- G. Gilbert and O. Hermant, *Normalization by Completeness with Heyting Algebras*, LPAR 20, LNCS 9450, pp. 469-482, 2015.
- G. Bury, D. Delahaye, D. Doligez, P. Halmagrand, O. Hermant, *Automated Deduction in the B Set Theory using Typed Proof Search and Deduction Modulo*, LPAR 20 (short papers), EPiC series in Computing 35, pp. 42-58, 2015.
- T. Pasquier, J. Singh, J. Bacon, O. Hermant, *Managing Big Data with Information Flow Control*, CLOUD 2015, IEEE, pp. 524-531
- V. Maisonneuve, O. Hermant and F. Irigoien, *Computing Invariants with Transformers : Experimental Scalability and Accuracy*, NSAD, ENTCS 307, pp. 17-31, 2014.
- L. Allali and O. Hermant, *Semantic A-Translations and Super-Consistency entail Classical Cut Elimination*, LPAR 19, LNCS ARCoSS 8312, pp. 407-422, 2013.
- M. Boudard and O. Hermant, *Polarizing Double-Negation Translations*, LPAR 19, LNCS ARCoSS 8312, pp. 182-197, 2013.
- D. Delahaye, D. Doligez, F. Gilbert, P. Halmagrand and O. Hermant, *Zenon Modulo : When Achilles Outruns the Tortoise using Deduction Modulo*, LPAR 19, LNCS ARCoSS 8312, pp. 274-290, 2013.
- G. Le Truong, D. Fedosov, O. Hermant, M. Manceny, R. Pawlak and R. Rioboo, *Programming Robots with Events*, IESS 2013, IFIP vol. 403, pp. 14-25, 2013.
- G. Le Truong, O. Hermant, M. Manceny, R. Pawlak and R. Rioboo, *Using Event-Based Style for Developing M2M Applications*, GPC 2013, LNCS vol. 7861, pp. 348-357, 2013.
- D. Cousineau and O. Hermant, *A Semantic Proof that Reducibility Candidates Entail Cut Elimination*, RTA 2012, LiPICS vol. 15, pp. 133-148, 2012.
- G. Le Truong, O. Hermant, M. Manceny, R. Pawlak and R. Rioboo, *Unifying Event-based and Rule-based Styles to Develop Concurrent and Context-aware Reactive Applications - Toward a Convenient Support for Concurrent and Reactive Programming*, ICSOFT 2012, SciTePress, pp. 347-350, 2012
- A. Brunel, O. Hermant and C. Houtmann, *Orthogonality and Boolean Algebras for Deduction Modulo*, TLCA'11, LNCS vol. 6990, pp. 76-90, Springer, 2011.
- O. Hermant and J. Lipton, *A Constructive Semantic Approach to Cut Elimination in Type Theories with Axioms*, CSL'08, LNCS vol. 5213, pp. 169-183, 2008.
- G. Dowek and O. Hermant, *A Simple Proof that Super-Consistency implies Cut Elimination*. Procs. of RTA'07, LNCS vol. 4533, pp. 93-106, Springer, 2007.
- R. Bonichon and O. Hermant, *On Constructive Cut Admissibility in Deduction Modulo*. Post-Proc. of TYPES'06, LNCS vol. 4502, p. 33-47, Springer, 2007.
- R. Bonichon and O. Hermant, *A Semantic Completeness Proof for TaMeD*, Procs. of LPAR'06, Phnom Penh, Cambodia, LNCS vol. 4246, pp. 167-181, Springer, 2006.
- O. Hermant, *Semantic Cut Elimination in The Intuitionistic Sequent Calculus*, TLCA'05, 2005, LNCS vol. 3461, pp. 221-233, Nara, Japan.

- A. Assaf, G. Burel, R. Cauderlier, D. Delahaye, G. Dowek, C. Dubois, F. Gilbert, P. Halmagrand, O. Hermant and R. Saillard, *Expressing Theories in the λ II-calculus modulo theory and in the DEDUKTI System*, TYPES 2016.
- D. Delahaye, D. Doligez, F. Gilbert, P. Halmagrand and O. Hermant, *Proof Certification in Zenon Modulo : When Achilles Uses Deduction Modulo to Outrun the Tortoise with Shorter Steps*, IWIL, 10th International Workshop on the Implementation of Logics, 2013.
- M. Boespflug, Q. Carbonneaux and O. Hermant, *The λ II-calculus Modulo as a Universal Proof Language*, PxTP 2012, CEURS-WS.org 878, pp. 28-43, 2012.
- O. Hermant, K. Khramenkova and R. Pawlak, *Simulator of a “Weather” Cloud*, 10th Finnish-Russian University Cooperation in Telecommunication workshop (FRUCT), Tampere, Finland, 2011.
- O. Hermant, G. Le-Truong, M. Manceny, R. Pawlak, *Dynamic Adaptation through Event Reconfiguration*, VADER Workshop, 2011, Hersonissos, Crete, Greece in : On the Move to Meaningful Internet Systems : OTM 2011 Workshops, LNCS 7046, pp. 637-646

RESEARCH THEMATICS

My work has greatly been focused on a logical formalism called *Deduction modulo*, which principle is to intricate calculus and reasoning : in a logical system such as Natural Deduction, for instance, we allow the use of a congruence on the formulæ, generated by a set of rewrite rules (on terms *and* formulæ). Recently, a proof-checker based on this paradigm, [Dedukti](#) appeared.

In this field, I focused on many subjects amongst which proof theory and especially semantics and models for cut elimination (constructive or not), as well as automatic proof-search methods (tableaux, resolution). Recently, within the frame of the starting (at 01/01/2012) Inria project-team “deducteam” I also began to contribute to the development of [Dedukti](#) as well as the study of its logical framework, the λ II-calculus modulo.

Inside ISEP’s research team in computer science, I had very few time left for research during the first two years. Indeed, I began by doing technology transfer during one year and a half, through development contracts with firms. My main realization is a platform used to monitor (very) distant solar power plants and its front-end interface for operators and administrators. Moreover ISEP’s professors have a bigger load of lectures (275h/year) than in public universities (192h/year).

After that, I began to have a more scientific activity within the research team, admittedly still with strong practical and implementation aspects, in parallel with more fundamental research, as described above. I partly supervise the thesis work of Giang Le Truong on the INI programming language, a rule-based and event-based programming language designed to have a high-level control on the changes of the environment (to pilot drones or robot, for example). My role was to define and promote a strong typing system, a good semantics and the development of tools to model-check INI code so as to have formal insurances on it.

After my recruitment as a researcher at CRI, MINES ParisTech, I am increasingly interesting myself in formal analysis of code, through the thesis work of Vivien Maisonneuve, on how to ensure the stability of the implementation on microcontrollers of control systems, proved stable “in theory”. Also, I got involved in C code analysis with abstract interpretation and in parallelization of code, through the [PIPS](#) source-to-source compiler. Finally, I am building a strong partnership with the Inria deducteam project-team, through the co-supervision of the Ph.D. theses of Ronan Saillard and Pierre Halmagrand. Ronan Saillard is currently the main developer of [Dedukti](#), while Pierre Halmagrand is building an automated theorem proving tool (based on the tableaux method) for Deduction modulo in general, and set theory in particular.