

CURRICULUM VITÆ

Patrick BAILLOT

19 mars 2008

Chargé de recherche 1e classe (Research associate) au CNRS (Centre National de la Recherche Scientifique), section 7, Département ST2I.

Laboratoire d'Informatique de Paris-Nord (UMR 7030 du CNRS).

Team *Logique, Calcul et Raisonnement* (Logic, Computation and Reasoning).

Professional address :

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Personal Information

Birth date and place : July 23, 1972, in Québec (Canada). Citizenship : French.

1 Education :

– 3/2008 : *Habilitation à diriger les recherches, Spécialité : informatique,*

Title : *Linear logic, Types and Implicit Computational Complexity.* Université Paris 13, defended on March 11th 2008.

Jury : P.-L. Curien (Referee), C. Fouqueré, J.-Y. Girard (President), M. Hofmann (Referee), J.-Y. Marion, C.-H. Luke Ong (Referee), S. Ronchi Della Rocca, J. Vauzeilles.

– 11/1995 to 1/1999 : PhD thesis, Université Aix-Marseille II (speciality : Discrete mathematics and foundations of computer science).

Title : “Approches dynamiques en sémantique de la logique linéaire : jeux et géométrie de l’interaction” (Dynamical approaches in semantics of linear logic : games and geometry of interaction) defended on January 22nd 1999 at Faculté de Luminy (Marseille).

Advisor : J.-Y. Girard. Co-advised by Laurent Régnier.

Referees : J.-L. Krivine (Paris 7), G. McCusker (Univ. of Sussex, UK).

Mention très honorable.

– 7/1995 : *Agrégation de mathématiques.*

– 1994-95 : *DEA de logique et fondements de l’informatique de l’Université Paris 7* (equivalent to a Master).

- 1992-95 : *Magistère de Mathématiques* (including *Licence et Maîtrise de Mathématiques*) Université Paris 11/ ENS de Cachan (*élève de l'ENS de Cachan*). *Licence de Philosophie*, Université Paris 1 (1994).

2 Professional Experience

2.1 Positions :

- Since January 2006 : *chargé de recherches 1e classe au CNRS*.
- October 2001 : *chargé de recherches 2e classe au CNRS*, section 07 (département STIC). Member of Laboratoire d'Informatique de Paris-Nord (UMR 7030).
- October 2000- August 2001 : temporary teaching and research position (ATER) at École Supérieure de Mécanique de Marseille (Université Aix-Marseille II), and Laboratoire d'Informatique de Marseille (Research group : MOVE, led by R. Amadio) .
- September 1999 to September 2000 : Post-doctoral Fellowship at *Laboratory for Foundations of Computer Science* (University of Edinburgh, UK) funded by the European Network "Linear Logic in Computer Science". Advisor : S. Abramsky.
- September 1996 to September 1999 : PhD student (until 1/1999) at Université Aix-Marseille II, Institut de Mathématiques de Luminy (CNRS), *allocataire-moniteur-normalien en Mathématiques*. .
- September 1992 to September 1996 : *élève de l'École Normale Supérieure de Cachan*, Mathematics Department.

2.2 Participation to Research Projects

– As scientific leader :

In charge of the project *Nouveaux Outils pour la Complexité : Sémantique et Types* NO-CoST (New tools for Complexity : Semantics and Types); Project *Young Researchers* of ANR (Agence Nationale de la Recherche); duration : 3 years; funding : 150 keuro; started on 1/11/2005.

Sites of the project : LIPN (Paris 13), PPS (Paris 7). 6 permanent participants (on 1/10/2006). <http://www-lipn.univ-paris13.fr/nocost/>

Projects of international exchanges :

- 2002 : programme Vinci France-Italie (Université Franco-Italienne). Travels of researchers. Partner site : Université Roma Tre (Italy).
 - 2004-2006 : cooperation CNRS-CNR France-Italie (2 years) (Direction des relations internationales du CNRS). Italian leader : M.Pedicini. Title : *Interaction et complexité*. Partner site : IAC CNR Rome. (Project renewed in 2006 and coordinated by Olivier Laurent and Marco Pedicini).
- #### – As site leader :
- National projects :
- 2003-06 : ACI *Nouvelles interfaces des Mathématiques* GEOCAL (Géométrie du Calcul / Geometry of Computation). Scientific leader : T.Ehrhard. Duration : 3 years. 10 participating sites.
 - 2003-06 : ACI *Sécurité Informatique* CRISS (Contrôle de Ressources et d'Interférences dans

les Systèmes Synchrones / Control of Resources and Interference in Synchronous Systems).
Scientific leader : R.Amadio. Duration : 3 ans. 4 participating sites.

– 2002-03 Action Spécifique CNRS (Dpt STIC) *Méthodes Formelles pour la Mobilité* / Formals Methods for Mobility. Scientific leader : R.Amadio.

– **As participating member :**

project MathSTIC (2001-02) *Logique et sémantique de la programmation* / Logic and semantics of Programming., Coordinated by laboratories IML (Marseille) and PPS (Paris).

2.3 Program committees, Organization of Workshops

International Conferences :

2008 : Member of the Program Committee of CSL'08, *17th EACSL Annual Conference on Computer Science Logic*.

Workshops :

– Member of the Scientific committee of the meeting *Geometry of Computation* (GEOCAL 2006) : CIRM (Centre International de Rencontres Mathématiques, Marseille), January-February 2006.

– Organisation of workshops :

– *Journées 2008 des groupes de travail GEOCAL et LAC (Géométrie du Calcul et Logique, Algèbre et Calcul)* du GDR IM, co-organized with Micaela Mayero and Virgile Mogbil, March 6-7 2008, around 45 participants :

<http://www-lipn.univ-paris13.fr/~mogbil/gdr-im08/>

– *Workshop on Implicit Computational Complexity* (co-organized with J.-Y. Marion) , 13-17/2/2006, as part of the meeting GEOCAL 2006, Marseille, 20 talks and 50 participants (from 7 countries).

<http://www-lipn.univ-paris13.fr/~baillot/GEOCAL06/workshopICC.html>

Following this workshop a Special Issue of *ACM Transactions on Computational Logic* on Implicit Computational Complexity is in preparation, with guest editors P. Baillot, J.-Y. Marion, S. Ronchi Della Rocca.

– *Implicit Computational Complexity and Logic* (as part of project GEOCAL), co-organized with V. Mogbil, September 2004, Université Paris 13, Villetaneuse, 30 participants.

<http://lipn.fr/~baillot/workshopGEOCAL/complexite.html>

– Organization of a course “Complexity and Logic” as part of the Winter School of the GEOCAL06 (Geometry of Computation) meeting (12 hours) , CIRM Marseille, lecturers : P. Baillot, M. Hofmann, J-Y. Marion ; 6-10 February 2006. 55 participants.

2.4 Organization of seminars

– Coordinator of the seminar of the team *Logic, Computation and Reasoning* of LIPN from 2002 to September 2005 (2 talks by month in average).

– Coordinator of the seminar (*groupe de travail*) *Implicit Computational Complexity*, as part of project NO-CoST, LIPN : from 2 to 4 talks per month, since September 2005.

<http://www-lipn.univ-paris13.fr/nocost/>

2.5 Other responsibilities

- *directeur de recherche du stage de Paulin Jacobé de Naurois comme CR2 du CNRS*, 10/2006 to 10/2007, LIPN.
- *correspondant-formation CNRS du LIPN* from September 2002 to September 2005.

3 Research activity

3.1 Main research interests

- Linear logic, lambda-calculus, functional programming.
- Implicit computational complexity ; logical systems and types for computational complexity.
- Denotational semantics, game semantics, geometry of interaction.

3.2 Invited Talks, Tutorials

– Invited talks at international conferences :

2007 : invited talk at the *International Conference on Typed Lambda-Calculi and Applications* (TLCA'07), Paris, june 2007. Title : *From Proof-Nets to Linear logic type systems for polynomial time computing*.

– Invited talks at international workshops :

2007 : P. Baillot and Ugo Dal Lago “On the Linear logic approach to implicit computational complexity”, Workshop dedicated to Jean-Yves Girard, 17-20/5/2007, Siena (Italy).

2004 : P. Baillot “Type Inference for Light Affine Logic Via Constraints on Words”, 6th International Workshop on Logic and Computational Complexity (LCC'04) (satellite workshop of LICS'04), 12/7/04, Turku, Finland.

– Tutorials (Research schools) :

2008 (forthcoming) : course “Complexité calculatoire implicite” as part of *École Jeunes Chercheurs en Informatique Mathématique (GDR IM)*, Marseille, march 31- april 4 2008

2006 : tutorial (1 talk) as part of the course *Implicit Computational Complexity* (Lecturer in charge : Simone Martini), Bertinoro International Spring School for Graduate Studies in Computer Science, Italy, March 2006.

2006 : tutorial (*Linear logic, lambda-calculus and polynomial time complexity*) as part of a course “Complexity and Logic” at the Winter School of GEOCAL06 (Geometry of Computation), CIRM Marseille, February 2006.

3.3 Supervision of Master and PhD Thesis

– Master Thesis advised :

2003 : D. de Carvalho (DEA de logique université P7), *Logique linéaire, complexité polynomiale et théorie des ensembles naive*.

2005 : V. Atassi (MPRI, Master STL université P6), *Inférence de type en logique linéaire élémentaire et complexité des programmes fonctionnels*. Co-advised with J. Vauzeilles.

– PhD Thesis :

– 2003-07 : co-advising with Thomas Ehrhard (*Directeur*) of the thesis of Daniel de Carvalho, université Aix-Marseille II. "Sémantiques de la logique linéaire et temps de calcul". Defended on September 4th 2007 in Marseille. *Allocation de thèse de l'ACI NIM GEOCAL*.

Current situation of D. de Carvalho : Postdoctoral fellow at LORIA-INRIA Nancy.

- Since 9/2005 : co-advising with Jacqueline Vauzeilles (*Directeur*) of the thesis of Vincent Atassi, Université Paris 13.

Topic : *Programmation fonctionnelle, typage en logique linéaire et réduction optimale.*
Allocation de thèse de l'Ecole doctorale.

3.4 Post-Doctoral Grants

I have been responsible for the following Postdoctoral Fellowships :

- Damiano Mazza, 1/10/2006-1/10/2007, Postdoctoral Fellowship funded by project NO-CoST (project of Agence Nationale de la Recherche).

Current situation : Postdoctoral Fellow at PPS-Université Paris 7 (FSM).

- Ugo Dal Lago, 1/5/2006-31/10/2006. Postdoctoral Fellowship from University Paris 13.

Current situation : *Ricercatore* (Lecturer) of Università di Bologna.

- Jean-Yves Moyen, 1/9/2005-31/8/2006. Postdoctoral Fellowship from CNRS. *Département STIC, Campagne PostDoc 2005.*

Current situation : *Maître de Conférences* (Lecturer) at Université Paris 13, LIPN, since 9/2006.

3.5 Participation to juries of PhD Thesis

I have been a member of the juries of the following PhD Thesis :

- Pierre Boudes, *Hypercohérences et Jeux*, Université Aix-Marseille II, décembre 2002.
- Daniel de Carvalho (as co-adviser), *Sémantiques de la logique linéaire et temps de calcul*, Université Aix-Marseille II, September 2007.
- Romain Péchoux, *Analyse de la complexité des programmes par interprétation sémantique*, INPL-LORIA Nancy, 14/11/2007.
- Marco Gaboardi, *Linearity : an Analytic Tool in the Study of Complexity and Semantics of Programming Languages*, Università di Torino (Italie), 12/12/2007.

3.6 International visitors

I have been responsible for the following visits of foreign researchers with whom I have collaborated :

- Kazushige Terui (National Institute of Informatics, Japan) : 5 visits since 2002 (for a total of 12 weeks). In 2007 a visiting position of 6 months from CNRS at Laboratoire d'Informatique de Paris-Nord was obtained for K. Terui.
- Martin Hofmann (LMU Munich, Germany) : 1 month in 2007 (invited Professor of University Paris 13).
- Harry Mairson (Brandeis, USA) : 2 weeks in 2006 (funded by project NO-CoST), 1 week in 2005.
- Paolo Coppola (Udine, Italy) : May-June 2006 (2 months) (invited Lecturer of University Paris 13).
- Simone Martini (Bologna, Italy) : 4 weeks in November-December 2004 (invited Professor of University Paris 13).

- Glynn Winskel (Cambridge, UK) : 3 weeks between March and May 2004 (invited Professor of University Paris 13).
- Marco Pedicini (IAC CNR Rome, Italy) : 4 weeks in 2004; 3 weeks in 2005.

3.7 Invitations and visits abroad (selection)

I have done the following visits for scientific collaborations, either invited by the hosting team, or as part of a mission funded by my lab or a project :

Invitations

- March 2006 (1 week) : Keio University, Tokyo, Japon : invited by M. Okada.
- April 2006 (1 week) : National Institute of Informatics, Japon : invited by K. Terui.

Other visits abroad

- 2005 : NII Tokyo, Japan October-November : 1 week (host : K.Terui) ; University of Padova, Italy : 8 weeks (research team of G. Sambin).
- 2004 : University of Padova, Italy : 6 weeks (research team of G.Sambin) ; IAC CNR Rome, Italy : 1 week (host : M. Pedicini).
- 2003 : University of Cambridge (UK), Computer Lab : 3 weeks.

3.8 Publications

– International Journals : 5

- [1] V. Atassi, P. Baillot, K. Terui. “Verification of Ptime Reducibility for system F Terms : Type Inference in Dual Light Affine Logic”. *Logical Methods in Computer Science*, 3(4 :10), pp. 1–32, journal extended version of article [7], 2007.
- [2] U. Dal Lago and P. Baillot. “On Light Logics, Uniform Encodings and Polynomial Time”, *Mathematical Structures in Computer Science*, 16(4), pp. 713-733, Cambridge University Press, 2006.
- [3] P. Baillot. “Type inference for light affine logic via constraints on words”, *Theoretical Computer Science*, 328(3) :289-323, Elsevier, december 2004.
- [4] P. Baillot. “Stratified coherence spaces : a denotational semantics for Light Linear Logic”, *Theoretical Computer Science*, 318 (1-2), pp.29-55, Elsevier, 2004.
- [5] P. Baillot and M. Pedicini. “Elementary Complexity and Geometry of Interaction”, *Fundamenta Informaticae* vol. 45, no 1-2, pp. 1–31, janv. 2001 (special issue on TLCA’99).

– Articles in Proceedings of international conferences with program committee : 9

- [6] P. Baillot, P. Coppola, U. Dal Lago. “Light Logics and Optimal Reduction : Completeness and Complexity”, Proceedings *International Symposium on Logic in Computer Science (LICS’07)*, pp 421–430. IEEE Computer Society Press, 2007.
- [7] V. Atassi, P. Baillot, K. Terui. “Verification of Ptime reducibility for system F terms via Dual Light Affine Logic”, *Proceedings Computer Science Logic 2006 (CSL’06)*, LNCS 4207, pp.150-166, Springer, 2006.
- [8] P. Baillot and K. Terui. “A feasible algorithm for typing in Elementary Affine Logic”, Proceedings *7th International Conference on Typed Lambda-calculi and Applications (TLCA’05)*, LNCS 3461, pp.55-70, Springer, 2005.
- [9] P. Baillot and K. Terui. “Light types for polynomial time computation in lambda-calculus”, Proceedings *International Symposium on Logic in Computer Science (LICS’04)*, pp. 266-275, IEEE Computer Society Press, 2004.

- [10] P. Baillot and V. Mogbil. “Soft lambda-calculus : a language for polynomial time computation”, Proceedings *Foundations of Software Science and Computation Structures (FoS-SaCS’04)*, volume 2987 of LNCS, pp.27-41, Springer, 2004.
- [11] P. Baillot. “Checking polynomial time complexity with types”, Proceedings of *IFIP conference on Theoretical Computer Science*, pp.370-382, Kluwer Academic Press 2002.
- [12] P. Baillot and M. Pedicini. “Elementary complexity and geometry of interaction (Extended Abstract)”, Proceedings 4th *International Conference Typed Lambda Calculi and Applications (TLCA’99)*, LNCS 1581, Springer, 1999. (conference version of article [5])
- [13] P. Baillot, V. Danos, T. Ehrhard and L. Regnier. ”Timeless games”, Proceedings 11th *International workshop on Computer Science Logic (CSL’97)*, Lecture notes in Computer Science (1414), Springer, 1997.
- [14] P. Baillot, V. Danos, T. Ehrhard and L. Regnier. “Believe it or not, AJM games model is a model of Classical Linear Logic”, Proceedings 12th *International Symposium on Logic in Computer Science (LICS’97)*, IEEE Computer Society Press, 1997.
- **Invited articles at international conferences : 1**
- [15] P. Baillot. “From Proof-Nets to Linear Logic Type Systems for Polynomial Time Computing”. Invited talk. Proceedings of *International Conference on Typed Lambda Calculi and Applications (TLCA’07)*, LNCS 4583, pp. 2-7, Springer, 2007.
- **Volumes edited :**
- P. Baillot, S. Ronchi Della Rocca, J.-Y. Marion (guest editors), Special Issue on Implicit Computational Complexity, *ACM Transactions on Computational Logic*, special issue in preparation.
- **International Workshops with Program Committee and without Proceedings :**
- [16] P. Baillot, U. Dal Lago and J.-Y. Moyen. “On Quasi-Interpretations, Blind Abstractions and Implicit Complexity”, *8th International Workshop on Logic and Computational Complexity (LCC’06)* (Satellite de LICS’06), Seattle, Preprint HAL ccsd-00023668, August 2006.
- [17] P. Baillot and M. Pedicini. “An Embedding of the BSS Model of Computation in Light Affine Lambda-Calculus”, *8th International Workshop on Logic and Computational Complexity (LCC’06)* (Satellite of LICS’06), Seattle, Preprint HAL ccsd-00085547, August 2006.
- [18] U. Dal Lago and P. Baillot. “On Light Logics, Uniform Encodings and Polynomial Time”, *Workshop on Logics for Resources, Processes, and Programs (LRPP’04)* (affiliated with LICS 2004 and ICALP 2004), 11 p., Turku, Finland, 2004 (preliminary version of [2]).
- [19] P. Baillot. “Stratified coherent spaces : a denotational semantics for Light Linear Logic”, *Workshop on Implicit Computational Complexity (ICC’00)* (affiliated with LICS 2000), 10 p., Santa Barbara, 2000 (preliminary version of [4]).
- **Posters :**
- [20] A. Suna, A. El Fallah-Seghrouchni, C. Fouqueré, P. Baillot. “Mobile Multi-Agent Systems : A Programming Language and Its Semantics”, 3rd International Joint Conference on Autonomous Agents and Multiagent Systems (AAMAS 2004), pp. 1386-1387, IEEE Computer Society, 2004.
- **Papers submitted for publication :**
- [21] P. Baillot, K. Terui. *Light types for polynomial time computation in lambda calculus* (long version),

35 pages, journal long version of the article [9], 10/2007, submitted to an international journal.
[22] P. Baillot, D. Mazza. *Linear Logic by Levels and Bounded Time Complexity*. 49 pages. submitted to an international journal, 12/2007.

– **Other works :**

[23]P. Baillot. PhD thesis : *Approches dynamiques en sémantique de la logique linéaire : jeux et géométrie de l'interaction*,
Université Aix-Marseille II, january 1999.

3.9 Talks at Seminars, Workshops, Meetings (selection)

- Turin (Italy), Computer Science Department, “Light Logic, Optimal reduction and polynomial time computation in λ -calculus”, Talk at the occasion of the Thesis day of M.Gaboardi, 12/12/2007.
- Nancy, LORIA-INPL, same title, Talk at the occasion of the Thesis day of R. Péchoux, 14/11/2007.
- Chambéry, réunion du groupe LAC du GDR Mathématique Informatique. “On Quasi-Interpretations, Blind Abstractions and Implicit Complexity”, 9/2/2007.
- Bologna (Italy), Meeting of the Italian project FOLLIA. “Verification of Ptime reducibility for system F terms via Dual Light Affine Logic”, 17/10/2006.
- Keio University, Japan, Workshop on Linear logic, proof-theory and computer science. “Inferring Light types for guaranteeing polynomial time bounds in system F” 17/3/2006.
- ENS Lyon, LIP Seminar. “De la Logique linéaire à la complexité implicite”, 22/11/2005.
- National Institute of Informatics (NII Logic Seminar), Tokyo, Japan. “From Linear Logic to Implicit Computational Complexity”, 14/4/2005, and “Verification of Ptime reducibility for system F lambda-terms via Linear logic” 31/10/2005.
- Université Aix-Marseille II, IML, Séminaire Logique de la Programmation. “Des types light pour la réduction en temps polynomial en lambda-calcul”, December 2004.
- Università Roma Tre (Italie), Logic Seminar. “Light types for ptime computation in lambda-calculus”, November 2004.
- Université de Chambéry, LAMA. " Des types light pour le temps polynomial en lambda-calcul", October 2004.
- Université Paris 7, Seminar of PPS. “Des types light pour la réduction en temps polynomial en lambda-calcul”, June 2004.
- Université de Caen, GREYC, Séminaire d’algorithmique de Caen. “Logique linéaire : une introduction”, March 2004.
- Université Paris 7, Seminar of PPS. “Inférence de type pour la complexité polynomiale et contraintes sur les mots”, October 2003.
- Università di Padova (Italy) “Types for polynomial time programming”, May 2003.
- University of Cambridge (UK), Logic and Semantics Seminar. “Type Inference in Light Affine Logic and Polynomial-Time Computation”, February 2003.

3.10 Refereeing activity

I have refereed articles submitted to :

- the international journals : Mathematical Structures in Computer Science, Journal of Symbolic Logic, Journal of Functional Programming, Theoretical Computer Science, Information and

Computation, ACM Transactions on Computational Logic, Fundamenta Informaticae, Logical Methods in Computer Science, Logic Journal of the IGPL.

- the international conferences : International Symposium on Logic in Computer Science (LICS, IEEE) (6 years), Conference on Typed Lambda-calculi and Applications (LNCS Springer) (4 years), Conference on Computer Science Logic (LNCS Springer) (3 years), FoSSaCS (LNCS Springer) (2 years), Conference on Concurrency (LNCS Springer), Conference on Principles of Programming Languages, POPL (ACM) (2 years).

3.11 Activity for popular science (*Vulgarisation scientifique*)

- *Entretien Les jeux précèdent-ils la logique ?*, Magazine *La Recherche*, No 411, p. 29, September 2007.
- Participation to *Fête de la Science* (popular science event), *Savante banlieue* Université Paris 13, Poster (*Raisonnement en Informatique*), October 2004 and October 2005.

4 Teaching

4.1 Master courses

- from 2005 to 2008 : Master Parisien de Recherche en Informatique (University Paris 7) : 9h, and 12h in 2008 (*Logique linéaire et complexité*) as part of the course *Logique linéaire et paradigmes logiques du calcul* (resp. : Roberto Di Cosmo and Dale Miller).
- 2004-05 : Master Parisien de Recherche en Informatique : one session (3h) as part of the course *Logique linéaire et paradigmes logiques du calcul* (resp. : Roberto Di Cosmo and Dale Miller).
- 2003-04 : DEA de Logique Mathématique et Fondements de l'Informatique (University Paris 7) : course *Théorie de la démonstration*, joint course with Olivier Laurent, 24h.
- 2001-02 and 2002-03 : DEA de Logique Mathématique et Fondements de l'Informatique (University Paris 7) : participation to the course *Théorie de la démonstration* (resp. : Jacqueline Vauzeilles), 12h per year.

4.2 Undergraduate teaching (since 2000)

- 2002-03 et 2003-04 : *Logique (cours)*, 1ere année de Formation d'Ingénieur (*Licence*), Institut Galilée, Université Paris 13; 11h per year.
- 2000-01 : *cours d'Algorithmique et cours d'introduction aux Bases de données (SQL)* à l'Ecole Supérieure de Mécanique de Marseille.