

Curriculum Vitæ

Full name: Alejandro Díaz-Caro

Date and place of birth: 06/Feb/1981, Corrientes capital, Argentina

Professional address: Depto de Ciencia y Tecnología, Universidad Nacional de Quilmes

Roque Sáenz Peña 352, B1876BXD Bernal, Buenos Aires, Argentina

Telephone: +54 11 365 7100 # 4310

E-mail: alejandro@diaz-carro.info

Home page: <http://www.diaz-carro.info>

1 Education

- **PhD in Computer Science**

Institution: Université de Grenoble

Lab of affiliation: Laboratoire d'Informatique de Grenoble, France

Starting date: 17/Oct/2008

Defense date: 23/Sep/2011

Thesis: Du typage vectoriel (On vectorial typing)

Funding: Allocation de Recherche granted by the Ministère de l'Enseignement Supérieur et de la Recherche

Advisor: Pablo Arrighi – Co-advisor: Frédéric Prost

Jury:

Philippe Jorrand	CNRS	(président)
Eduardo Bonelli	Universidad Nacional de Quilmes & CONICET	(rapporteur)
Gilles Dowek	INRIA Centre Paris-Rocquencourt	(rapporteur)
Thomas Ehrhard	PPS, Université Paris-Diderot	(rapporteur)
Michele Pagani	LIPN, Université Paris 13	(examineur)
Laurent Regnier	IML, Université de la Méditerranée	(examineur)
Lionel Vaux	IML, Université de la Méditerranée	(examineur)
Pablo Arrighi	LIG, Université de Grenoble	(directeur)

- **Licenciatura en Ciencias de la Computación** (*Computer Science, eq. Research Masters in Europe*)

Institution: Universidad Nacional de Rosario, Argentina

Date: 21/Dec/2007

Thesis: Agregando medición al cálculo de van Tonder

Advisors: Manuel Gadella and Pablo E. Martínez-López

2 Positions after the PhD

- **Tenured Assistant Professor (Spanish “Profesor Adjunto de Dedicación Exclusiva”)**

Institution: Universidad Nacional de Quilmes

Starting date: 11/Aug/2014

- **Non-tenured teaching and research fellow (French “ATER”) – Two years**

Teaching duties: Université Paris-Ouest Nanterre La Défense

Research: INRIA Paris-Rocquencourt

Starting date: 01/Oct/2012 – End of contract: 31/Aug/2014

- **Postdoctoral fellow**

Institution: Université Paris 13

Lab of affiliation: Laboratoire d'Informatique de Paris-Nord

Starting date: 01/Oct/2011 – Ending date: 30/Sep/2012

Funding: DIGITEO Consortium, Région Île-de-France through project 2011-070D “ALAL”

Main researchers: Michele Pagani (Université Paris 13) and Gilles Dowek (INRIA)

3 Teaching

Notice

In France exists three kinds of teaching:

- TP (Travaux pratiques) Each hour counts for $\frac{2}{3}$ hours of TD (or HeqTD).
- TD (Travaux dirigés).
- CM (Cours magistral) Each hour counts for 1.5 HeqTD.

Summary

Teaching in France: 465 HeqTD

Teaching in Argentina: 2 positions of “ayudante de primera” and 1 of “ayudante de segunda”

Detailed

- **Université Paris Ouest Nanterre La Défense, Nanterre, France.** 2012–2014. (In French language)
As ATER “Attaché temporaire d’enseignement et de recherche” (Temporary teaching and research fellow). This position is obtained by competition and it demands 192 hours of teaching by year (same amount required to the Maîtres des Conférences and Professeurs).
 - *Mathématiques 1: Calcul et fonctions* (Level: 1st year) – 2012: 90hs (TD) – 2013: 72hs (TD).
 - *Statistiques et probabilités* (Level: 2nd year) – 2013: 6hs (TD) – 2014: 18hs (TD).
 - *Mathématiques 1* (Level: 1st year) – 2012: 24hs (TD).
 - *Mathématiques 2* (Level: 1st year) – 2013: 24hs (TD) – 2014: 18hs (TD).
 - *Probabilités* (Level: 2nd year) – 2014: 36hs (TD).
 - *Méthodologie de la mesure en sciences humaines* (Level: 1st year) – 2013: 48hs (TD) – 2014: 48hs (TD).
- **Institute National Polytechnique de Grenoble ESISAR, Valence, France.** (In English language)
As “vacataire” (Teaching assistant). In particular, I designed the syllabus of the “Computability and complexity” cours¹.
 - *Computabilité et complexité* (Level: 5th year) – 24.5hs (CM) and 7hs (TD).
 - *Théorie des graphes* (Level: 5th year) – 10.5hs (CM) and 7hs (TD).
- **Université Joseph Fourier, Grenoble, France.** (In French language)
As “vacataire” (Teaching assistant).
 - *Introduction à la logique et la preuve formelle* (Level: 1st year) – 16.5hs (TD).
- **Universidad Nacional de Rosario, FCEIA, Rosario, Argentina.** (In Spanish language)
As Teaching Assistant. These positions are obtained by competition.
 - Escuela de Formación Básica (2008)
“Ayudante de primera, dedicación simple” (Graduate Teaching Assistant)
 - * *Álgebra y Geometría I* (Level: 1st year)
 - * *Análisis Matemático I* (Level: 1st year)
 - Departamento de Ciencias de la Computación (2007)
“Ayudante de segunda, dedicación simple” (Undergraduate Teaching Assistant)
 - * *Análisis Matemático IV* (Level: 3rd year)

¹<http://www.diaz-carro.info/MA554.html>.

Nowadays called “Calcul et complexité”:

<http://esisar.grenoble-inp.fr/formation/enseignement-et-cours-detailles-annee-5-semester-1-specialisation-ir-216495.kjsp>.

4 Publications

REMARK: The common practice in this scientific community is that authors appear in alphabetical order.

International journal

- [ADC12] Pablo Arrighi and Alejandro Díaz-Caro. A System F accounting for scalars. *Logical Methods in Computer Science*, 8(1:11), 2012.

International conferences with referred proceedings

- [DCD13b] Alejandro Díaz-Caro and Gilles Dowek. The probability of non-confluent systems. In *Developments in Computational Models*, (edited by Mauricio Ayala-Rincón, Eduardo Bonelli and Ian Mackie), volume 144 of *Electronic Proceedings in Theoretical Computer Science*, pages 1–15. Open Publishing Association, 2014.
- [DCMP13] Alejandro Díaz-Caro, Giulio Manzonetto, and Michele Pagani. Call-by-value non-determinism in a linear logic type discipline. In *Logical Foundations of Computer Science*, (edited by Sergei Artemov and Anil Nerode), volume 7734 of *Lecture Notes in Computer Science*, pages 164–178. Springer Berlin Heidelberg, 2013.
- [DCD13a] Alejandro Díaz-Caro and Gilles Dowek. Non determinism through type isomorphism. In *Logical and Semantic Frameworks, with Applications*, (edited by Delia Kesner and Petrucio Viana), volume 133 of *Electronic Proceedings in Theoretical Computer Science*, pages 137–144. Open Publishing Association, 2013.
- [DCP12] Alejandro Díaz-Caro and Barbara Petit. Linearity in the non-deterministic call-by-value setting. In *Logic, Language, Information and Computation*, (edited by Luke Ong and Ruy de Queiroz), volume 7456 of *Lecture Notes in Computer Science*, pages 216–231. Springer Berlin Heidelberg, 2012.
- [BDCJ12] Pablo Buiras, Alejandro Díaz-Caro, and Mauro Jaskelioff. Confluence via strong normalisation in an algebraic λ -calculus with rewriting. In *Logical and Semantic Frameworks, with Applications*, (edited by Simona Ronchi della Rocca and Elaine Pimentel), volume 81 of *Electronic Proceedings in Theoretical Computer Science*, pages 16–29. Open Publishing Association, 2012.
- [ADCV12] Pablo Arrighi, Alejandro Díaz-Caro, and Benoît Valiron. A type system for the vectorial aspects of the linear-algebraic lambda-calculus. In *Developments of Computational Methods*, (edited by Elham Kashefi, Jean Krivine, and Femke van Raamsdonk), volume 88 of *Electronic Proceedings in Theoretical Computer Science*, pages 1–15. Open Publishing Association, 2012.
- [ADC11] Pablo Arrighi and Alejandro Díaz-Caro. In *Quantum Physics and Logic*, (edited by Bob Coecke, Prakash Panangaden, and Peter Selinger), volume 270/2 of *Electronic Notes in Theoretical Computer Science*, pages 206–215. Springer, 2011.
- [ADCGG11] Pablo Arrighi, Alejandro Díaz-Caro, Manuel Gadella, and Jonathan J. Grattage. Measurements and confluence in quantum lambda calculi with explicit qubits. In *Joint Quantum Physics and Logic and Developments in Computational Models*, (edited by Bob Coecke, Ian Mackie, Prakash Panangaden, and Peter Selinger), volume 270/1 of *Electronic Notes in Theoretical Computer Science*, pages 59–74. Elsevier, 2011.

National conferences with referred proceedings

- [DC05a] Alejandro Díaz-Caro. Generalización del algoritmo cuántico de teleportación. In *Workshop de Investigadores en Ciencias de la Computación*, (edited by Jorge Aguirre), pages 1–5. Río IV, Argentina, 2005. ISBN 950-665-337-2.

Referred technical Report

- [DC05b] Alejandro Díaz-Caro. A discussion on the teleportation protocol for states of n qubits. Technical Report SECYT-FCEIA, RT-ID 05/02, Universidad Nacional de Rosario, Argentina, 2005.

Theses

- [DC11] Alejandro Díaz-Caro. *Du typage vectoriel*. PhD thesis, Université de Grenoble, France, September 23, 2011.
- [DC07] Alejandro Díaz-Caro. Agregando medición al cálculo de van Tonder. Master's thesis, Universidad Nacional de Rosario, Argentina, December 21, 2007.

Submitted papers

- [ADCPT⁺14] Ali Assaf, Alejandro Díaz-Caro, Simon Perdrix, Christine Tasson, and Benoît Valiron. Call-by-value, call-by-name and the vectorial behaviour of the algebraic λ -calculus. Available at [arXiv:1005.2897](https://arxiv.org/abs/1005.2897), 2014.
- [DCD14] Alejandro Díaz-Caro and Gilles Dowek. Simply typed lambda-calculus modulo type isomorphisms. Available at <http://www.diaz-carro.info/stmti.pdf>, 2014.
- [ADCV13] Pablo Arrighi, Alejandro Díaz-Caro, and Benoît Valiron. The vectorial lambda-calculus. Available at [arXiv:1308.1138](https://arxiv.org/abs/1308.1138), 2013.

Referred international conferences without proceedings

- [ADCV11] Pablo Arrighi, Alejandro Díaz-Caro, and Benoît Valiron. Subject reduction in a curry-style polymorphic type system with a vectorial space structure. Presentation report in *9th Workshop on Quantitative Aspects of Programming Languages*, Saarbrücken, Germany, 2011.
- [DCPTV10] Alejandro Díaz-Caro, Simon Perdrix, Christine Tasson, and Benoît Valiron. Equivalence of algebraic λ -calculi. In *5th International Workshop on Higher-Order Rewriting*, Edinburgh, United Kingdom, 2010.

5 Responsibilities

Supervising

- **Advisor of masters thesis**

Student: Pablo Buiras

Institution: Universidad Nacional de Rosario

Degree: Licenciatura en Ciencias de la Computación²

Local co-advisor: Mauro Jaskelioff

Thesis: Aproximando los escalares de un λ -cálculo algebraico mediante cotas inferiores

Date: 14/Dec/2011

Description: The project was focused in the design of a type system for an extension of lambda calculus. The results of this work were published in the 6th Workshop on Logical and Semantic Frameworks with Applications (LSFA 2011) held in Belo Horizonte, Brazil, on August 27th, 2011. The final proceedings has been published in EPTCS.

²Equivalent to a research masters in the French system

Committee member

- Member of CAPICCyTE France (Advisory Committee for International Programs of Scientific and Technological Foreign Cooperation of the Argentine Ministry of Science, Technology and Productive Innovation). This committee has been created in January 2013, and it is composed by 6 researchers, 2 postdoctoral researchers and 1 PhD student. Its declared objective is to strengthen the international links between Argentina and France and to create the network of Argentine researchers in France (RCAF).

Participation in research projects

- ANR Blanc Inter II SIMI 2 project *LOCALI: Logical Approach to Novel Computational Paradigms*. Responsible: Gilles Dowek. 2012–2016.
- DIGITEO project 2011–070D *ALAL: ALgebraic Approaches to Lambda-calculi*. Responsible: Michele Pagani. 2011–2012.
- PEPS-INS2I project *QuAND: Quantitative Aspects of Non-Determinism*. Responsible: Lionel Vaux. 2010–2011.
- European FP6-STREP project *QICS: Foundational Structures in Quantum Information and Computation*. Responsible: Bob Coecke. 2009–2010.

6 Seminars and Workshops

International workshops

- Alejandro Díaz-Caro and Gilles Dowek. Simply Typed Lambda-Calculus Modulo Type Isomorphisms. In *20th Workshop Types for Proofs and Programs*. Paris, France. May 12–16, 2014.
- Alejandro Díaz-Caro and Gilles Dowek. Identifying isomorphic propositions. In *First Workshop of ANR-NSFC project LOCALI*. Beijing, China. November, 4–6, 2013.
- Alejandro Díaz-Caro and Pablo Arrighi. Un sistema de tipos vectorial. In *IV Congreso Latinoamericano de Matemáticos (CLAM 12)*. Córdoba, Argentina. August, 6–10, 2012.
- Alejandro Díaz-Caro and Gilles Dowek. Equivalence on propositions and proofs. In *Logic and interactions 2012 – Week on quantitative approaches*. Marseille, France. February 20–24, 2012.
- Alejandro Díaz-Caro. On vectorial typing. In *18th Workshop Types for Proofs and Programs*. Bergen, Norway. September 8–11, 2011.
- Alejandro Díaz-Caro and Barbara Petit. Sums in algebraic lambda-calculi. In *17th Workshop Types for Proofs and Programs*. Warsaw, Poland. October 13–16, 2010.
- Pablo Arrighi, Alejandro Díaz-Caro, and Benoît Valiron. A vectorial type system (work-in-progress). In *17th Workshop Types for Proofs and Programs*. Warsaw, Poland. October 13–16, 2010.
- Alejandro Díaz-Caro and Barbara Petit. An additive type system for the linear-algebraic λ -calculus. In *CONCERTO Meeting*. Turin, Italy. June 9–11, 2010.
- Pablo Arrighi and Alejandro Díaz-Caro. Vectorial System F. In *4th QNET Workshop*. Oxford, United Kingdom. December 10–11, 2009.

National workshops

- Alejandro Díaz-Caro and Gilles Dowek. Identifying isomorphic propositions. In *Journées LAC*. Créteil, France. November, 28–29, 2013.
- Alejandro Díaz-Caro. Vectorial types, non-determinism and probabilistic systems: Towards a computational quantum logic. In *Quantum Computing in Nancy*. Nancy, France. March 21, 2013.
- Alejandro Díaz-Caro, Giulio Manzonetto, and Michele Pagani. Poster: Logical interpretation of the non-determinism. In *Digiteo Annual Forum*. Palaiseau, France. November 13, 2012.

- Alejandro Díaz-Caro and Gilles Dowek. An algebraic approach towards a quantum curry-howard. In *Rencontre LOGOI*. Marseille, France. June 14, 2012.
- Pablo Buiras, Alejandro Díaz-Caro, and Mauro Jaskelioff. Confluence via strong normalisation in an algebraic λ -calculus with rewriting. In *1ère rencontre 2011 QuAND*. Marseille, France. July 18, 2011.
- Pablo Arrighi and Alejandro Díaz-Caro. A vectorial type system. In *2ème rencontre QuAND*. Lyon, France. November 5, 2010.
- Alejandro Díaz-Caro and Barbara Petit. An additive type system for the linear-algebraic lambda-calculus. In *1ère rencontre QuAND*. Marseille, France. June 8, 2010.
- Alejandro Díaz-Caro, Simon Perdrix, Christine Tasson, and Benoît Valiron. Equivalence of algebraic λ -calculi. In *1ère rencontre QuAND*. Marseille, France. June 8, 2010.
- Pablo Arrighi and Alejandro Díaz-Caro. A vectorial System F: work in progress. In *Journées GEOCAL-LAC*. Nice, France. March 15–17, 2010.
- Alejandro Díaz-Caro and Julián Samborski-Forlese. Brevisísima introducción a la computación cuántica. In *Jornadas Abiertas de Informática v2.0*. SADIO, Rosario, Argentina. December 5, 2006.
- Alejandro Díaz-Caro and Julián Samborski-Forlese. Brevisísima introducción a la computación cuántica. In *4tas Jornadas de Ciencias de la Computación*. Rosario, Argentina. October 26–27, 2006.
- Alejandro Díaz-Caro. Teleportación cuántica. In *3ras Jornadas de Ciencias de la Computación*. Rosario, Argentina. December 6–7, 2005.

Given seminars³

- Type theory modulo isomorphisms. Aix-Marseille Université. LDP (I2M). Marseille, France. April 9, 2014.
- Simply typed lambda-calculus modulo type isomorphisms. INRIA. DEDUCTEAM (Paris-Rocquencourt), Paris, France. February 7, 2014.
- Hacia una lógica computacional cuántica. Universidad Nacional de Rosario. FCEIA. Rosario, Argentine. August 9, 2013.
- Vectorial types, non-determinism and probabilistic systems: Towards a quantum computational logic. Université Paris-Diderot. LIAFA. Paris, France. May 7, 2013.
- Vectorial types, non-determinism and probabilistic systems: Towards a quantum computational logic. Université Paris-Diderot. PPS. Paris, France. April 16, 2013.
- Non determinism (and probabilities) through type isomorphism. École Normale Supérieure. Plume (LIP). Lyon, France. February 21, 2013.
- Quantum computing, non-determinism, probabilistic systems...and the logic behind. Université Paris-Ouest. Modal'X (SEGMI), Nanterre, France. January 31, 2013.
- Non determinism through type isomorphism. INRIA. DEDUCTEAM (Centre Paris-Rocquencourt), Paris, France. October 12, 2012.
- Linearity in the non-deterministic call-by-value setting. Université Paris 13. LCR (LIPN), Villetaneuse, France. July 2, 2012.
- Algebraic type systems. École Polytechnique. Comète (LIX), Palaiseau, France. March 9, 2011.
- Algebraic type systems. Université Paris 13. LCR (LIPN), Villetaneuse, France. January 17, 2011.
- A System F accounting for scalars. Université d'Aix-Marseille. LDP (IML). Marseille, France. January 7, 2010.
- Vectorial System F. Université de Savoie. LIMD, (LAMA). Chambéry, France. May 18, 2009.

³Non exhaustive list

- From a scalar type system to a vectorial type system. École Polytechnique. TypiCal (LIX). Palaiseau, France. May 4, 2009.
- Scalar System F: Towards a quantum physical logic. École Normale Supérieure. Plume (LIP). Lyon, France. April 22, 2009.
- Adding Measurement to van Tonder’s calculus. Université Paris Sud. Algo (LRI), Orsay, France. March 17, 2008.
- Adding measurement to van Tonder’s calculus. Université de Grenoble. CAPP (LIG). Grenoble, France. March 4, 2008.
- Lambda-cálculo cuántico. Universidad Nacional de Rosario. Departamento de Ciencias de la Computación. Rosario, Argentina. July 15, 2007.
- Algoritmo de teleportación de n-qubits. Universidad de Valladolid. Departamento de Física. Valladolid, Spain. March 8, 2006.

7 Science popularisation

- Alejandro Díaz-Caro, “Tras las huellas de la computación cuántica”, Ensemble number 9. ISSN 1852-5911. <http://ensemble.educ.ar/?p=3143&numero=34>.
Ensemble is the electronic journal of the Maison Argentina of the Cité Internationale in Paris.
- Scientific blogging since 2005. <http://computacioncuantica.blogspot.com> (mostly in Spanish).

8 Summary of my research activity

Quantum computing, from a purely algorithmic point of view, set up a new model of computation. This model incorporates new ways of thinking the algorithms. Key concepts for it are the *quantum entanglement*: the property for which the state of some multi-parties systems cannot be described independently; the *superposition principle*: the ability of a system to be in more than one state at once; and the *no-cloning*: the impossibility of copying an unknown state. These concepts are unequalled to any classical one, although there are some common points with probabilistic models, as well as non-deterministic ones.

This theoretical computer science branch has its origin in physics; more precisely in the physicist Richard Feynman, who in 1981 gave a seminar in the Massachusetts Institute of Technology (MIT) about the problem of simulation of quantum physics by classical computers. Far from proposing any solution, he opened the doors for new questions never asked before. What gain could be achieved if the computers were governed by the quantum mechanics laws?. The answer did not come until the propositions by Grover [12] and Shor [14]. The former is an algorithm to perform a search over an unordered register, with a quadratic gain in temporal complexity with respect to any known classical algorithm. The latter is an algorithm for fast factorisation, with an even more impressive exponential gain. These results generated a great interest from computer scientist from all the fields. From a more fundamental perspective, the logical foundations behind quantum computing, remain still a mystery. Although there exists a quantum logic [3], it has been proposed much before quantum computing, and so their relation is hard to find.

Within the classical models for computing, the λ -calculus [6] highlights. It can be seen as the most simple and universal programming language, yet the very concept of computability can be defined in terms of λ -calculus. Moreover, the Curry-Howard correspondence establishes a direct relation between typed λ -calculus and proofs in constructive mathematics. Pursuing this correspondence, for quantum computing, has been the main motivation of my past research activity.

In particular, Lineal [1] is an extension of λ -calculus aiming to naturally express quantum programs. Whilst partly unexplained, it is nevertheless clear that the algorithmic speed-up of quantum computation arises by tapping into the parallelism granted to us ‘for free’ by the *superposition principle*; which establishes that some linear combination of the possible states of a system, are also states. The idea of vector space of λ -terms over an arbitrary scalar field arises quite naturally in this context. Such was the motivation behind Lineal.

A second independent line of work defined a similar extension: the algebraic λ -calculus [15], a calculus inspired from the study of relational models of linear logic [11]. Although their unrelated origins, we have proven a strong

connection between these two algebraic languages [DCPTV10, ADCPT⁺14][2], which suggest a connection between quantum computing and linear logic.

My PhD thesis consisted in developing a type theory for Lineal. The key idea and challenge was to introduce a type system where the types, in the same way as the terms, form a vectorial space, being able to type quantum programs, and providing information about the vectorial structure of the normal form of the terms. In the quest for this Vectorial type system [DC11, ADCV12, ADCV13] we have defined three intermediate systems, although interesting by themselves: The Scalar type system [ADC11, ADC12], the additive fragment of Lineal [DCP12], and a type system extending the additive fragment with approximations of the scalars [BDCJ12].

As postdoc at Paris 13, we studied a non-deterministic calculus through the light of linear logic [DCMP13]. Such a calculus can be seen as a *simplification* of Lineal, and follows a large trend of non-deterministic lambda calculi, e.g. [4, 5, 8, 9, 10, 13]. When I arrived in DEDUCTEAM, together with Gilles Dowek we realised that the non-determinism arises naturally just by considering some of the isomorphisms on types [7], as equivalent. We thus defined a proof system where isomorphic propositions have the same proofs, obtaining a non-deterministic λ -calculus in a much natural way [DCD13a, DCD14]. Later, we showed how to transform a non-deterministic system in probabilistic [DCD13b].

References

- [1] P. Arrighi and G. Dowek. Linear-algebraic lambda-calculus: higher-order, encodings, and confluence. In *RTA'08*, volume 5117 of *LNCS*, pages 17–31, 2008.
- [2] A. Assaf and S. Perdrix. Completeness of algebraic cps simulations. In *DCM'11*, volume 88 of *EPTCS*, pages 16–27, 2012.
- [3] G. Birkhoff and J. von Neumann. The logic of quantum mechanics. *Annals of Mathematics*, 37(4):823–843, 1936.
- [4] G. Boudol. Lambda-calculi for (strict) parallel functions. *Information and Computation*, 108(1):51–127, 1994.
- [5] A. Bucciarelli, T. Ehrhard, and G. Manzonetto. A relational semantics for parallelism and non-determinism in a functional setting. *Annals of Pure and Applied Logic*, 163(7):918–934, 2012.
- [6] Alonzo Church. An unsolvable problem of elementary number theory. *American Journal of Mathematics*, 58(2):345–363, 1936.
- [7] R. Di Cosmo. *Isomorphisms of Types: From Lambda-Calculus to Information Retrieval and Language Design*. Birkhauser Boston, 1995.
- [8] U. de'Liguoro and A. Piperno. Non deterministic extensions of untyped λ -calculus. *Information and Computation*, 122(2):149–177, 1995.
- [9] M. Dezani-Ciancaglini, U. de'Liguoro, and A. Piperno. Filter models for conjunctive-disjunctive lambda-calculi. *Theoretical Computer Science*, 170(1-2):83–128, 1996.
- [10] M. Dezani-Ciancaglini, U. de'Liguoro, and A. Piperno. A filter model for concurrent lambda-calculus. *SIAM Journal of Computing*, 27(5):1376–1419, 1998.
- [11] J.-Y. Girard. Linear logic. *Theoretical Computer Science*, 50:1–102, 1987.
- [12] Lov K. Grover. A fast quantum mechanical algorithm for database search. In *Proceedings of the 28th Annual ACM Symposium on Theory of computing*, STOC-96, pages 212–219. ACM, 1996.
- [13] M. Pagani and S. Ronchi della Rocca. Linearity, non-determinism and solvability. *Fundamenta Informaticae*, 103(1-4):173–202, 2010.
- [14] Peter W. Shor. Polynomial-time algorithms for prime factorization and discrete logarithms on a quantum computer. *SIAM Journal on Computing*, 26(5):1484–1509, 1997.
- [15] L. Vaux. The algebraic lambda calculus. *Mathematical Structures in Computer Science*, 19(5):1029–1059, 2009.

9 Scientific collaborations

In alphabetical order:

- **Pablo Arrighi**, Maître de Conférences at Université de Grenoble. We started a collaboration on an extension of a quantum λ -calculus when I did a short visit to Grenoble in March 2008, which derivated in a publication in QPL'08 (ENTCS 270(1):59-74, cf. Gadella). He became afterwards my PhD advisor and we have published together in three more instances (LMCS 8(1:11), EPTCS 88:1-15 and ENTCS 270(2):219-229). We have recently submitted another article to a journal.
- **Ali Assaf**, PhD student at DEDUCTEAM, INRIA. We have submitted a journal paper combining two previous results: A paper I published with Simon Perdrix, Benoît Valiron and Christinne Tasson, and a paper Ali and Simon Perdrix published together.
- **Gilles Dowek**, Directeur de Recherche INRIA and head of DEDUCTEAM research team. During my postdoc at Paris 13 we started a collaboration on a non-deterministic lambda-calculus obtained through type isomorphisms, which continues today. We published already two papers (EPTCS 113:137–144 and a new one just appeared in DCM'13), and we have another paper under review. Since I started my first ATER position at Nanterre in 2012, I became associated member to DEDUCTEAM, where we continue collaborating.
- **Manuel Gadella**, Physicist *Profesor* at Universidad de Valladolid, Spain. We started a collaboration when he was visiting Rosario and I was a Master student. He supervised my Master thesis, which resulted in a paper published in collaboration with Jonathan Grattage and Pablo Arrighi (later my PhD supervisor). The work was an extension to a quantum λ -calculus, adding a measurement operator to it. It has been presented in the Quantum Physics and Logic Workshop held at Oxford in 2008 and published in ENTCS 270(1):59-74.
- **Jonathan Grattage**, postdoc at Université de Grenoble when I started my PhD. We collaborated in the paper with Arrighi and Gadella (cf. Gadella).
- **Mauro Jaskelioff**, *Profesor* at Universidad Nacional de Rosario and *Investigador Asistente* at CONICET. We have worked together supervising **Pablo Buiras**, which led to a publication in LSFA 2011, published under EPTCS 81:16-29. (cf. Section 5).
- **Giulio Manzonetto**, Maître de Conférences at Université Paris 13. We have collaborated during my postdoc at Paris 13, with Michele Pagani, in the study of non-determinism in the light of linear logic, which resulted in a paper presented at LFCS 2013 and published in LNCS 7734:164-178.
- **Michele Pagani**, Maître de Conférences at Université Paris 13. We have collaborated during my postdoc at Paris 13 (cf. Manzonetto).
- **Simon Perdrix**, Chargé de Recherche CNRS at LORIA. He got the CR2 position at Grenoble during my second year of PhD, and we start a collaboration on the equivalence between two algebraic lambda-calculi, which had lead to a paper published with Valiron and Tasson, presented at HOR'10. We have recently submitted a journal version of it, together with Ali Assaf (cf. Assaf).
- **Barbara Petit**. Our collaboration started when we were both PhD students (Barbara at ENS-Lyon). We studied the linearity in the linear-algebraic λ -calculus, which derived in a paper presented at WoLLIC'12 and published in LNCS:7456,216–231.
- **Christine Tasson**, Maître de Conférences at Université Paris-Diderot (PPS). We started a collaboration when we were both PhD students (Christine at PPS). We have coauthored the paper presented at HOR'10 with Valiron and Perdrix (cf. Perdrix), and we have just submitted a journal version (cf. Assaf).
- **Benoît Valiron**, postdoc at Université Paris-Diderot (PPS). We started to collaborate when he was ATER at Grenoble, which later continued after he left. We published a first paper at HOR'10 (cf. Perdrix), and later a paper with Arrighi about the vectorial type system at EPTCS 88:1–15, 2012. We recently submitted the journal version of it (cf. Arrighi), and also the journal version of the former (cf. Assaf).

Last updated: July 29, 2014— <http://diaz-carro.info/CV-diazcaro.pdf>