

# 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

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## 1 Positions after the PhD

01/JUL/2016 – . . .

**Tenured Research Assistant (Spanish “Investigador Asistente”)**

Institution: CONICET (Argentina)

11/AUG/2014 – . . .

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

Institution: Universidad Nacional de Quilmes (Argentina)

12/JAN/2016 – 11/JUL/2016

**Invited researcher through the WWS program**

Institution: Università degli Studi di Torino (Italy)

01/OCT/2012 – 31/AUG/2014

**Non-tenured Assistant Professor (French “ATER”) – Two years**

Teaching duties: Université Paris-Ouest Nanterre La Défense (France)

Research: Inria Paris-Rocquencourt (France)

01/OCT/2011 – 30/SEP/2012

**Postdoctoral fellow**

Institution: Université Paris 13 – Laboratoire d’Informatique de Paris-Nord (France)

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

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

## 2 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 – Eduardo Bonelli – Gilles Dowek – Thomas Ehrhard

Michele Pagani – Laurent Regnier – Lionel Vaux – Pablo Arrighi

- **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

## 3 Publications

### International journals

- [ADCV17] Pablo Arrighi, Alejandro Díaz-Caro, and Benoît Valiron. The vectorial lambda-calculus. *Information & Computation*, 254(1):105-139, 2017.
- [ADCP<sup>+</sup>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  $\lambda$ -calculus. *Logical Methods in Computer Science*, 10(4:8), 2014.
- [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

- [DCD17] Alejandro Díaz-Caro and Gilles Dowek. Typing quantum superpositions and measurement. In *Theory and Practice of Natural Computing*, (edited by Carlos Martín-Vide, Roman Neruda, and Miguel A. Vega-Rodríguez), volume 10687 of *Lecture Notes in Computer Science*, pages 281–293. Springer, Cham, 2017.
- [DC17] Alejandro Díaz-Caro. A lambda calculus for density matrices with classical and probabilistic controls. In *Programming Languages and Systems*, (edited by Bor-Yuh E. Chang), volume 10695 of *Lecture Notes in Computer Science*, pages 448–467. Springer, Cham, 2017.
- [DCM17] Alejandro Díaz-Caro and Guido Martínez. Confluence in probabilistic rewriting. In *12th Workshop on Logical and Semantic Frameworks with Applications*, Brasilia, Brazil, 23–24 September 2017. (To be published in ENTCS).
- [CDC<sup>+</sup>17] Mario Coppo, Mariangiola Dezani-Ciancaglini, Alejandro Díaz-Caro, Ines Margaria, and Madalena Zacchi. Retractions in Intersection Types. In *The 8th Workshop on Intersection Types and Related Systems*, (Edited by Naoki Kobayashi), volume 242 of *Electronic Proceedings in Theoretical Computer Science*, pages 31–47, Open Publishing Association, 2017.
- [DCY16] Alejandro Díaz-Caro and Abuzer Yakaryilmaz. Affine computation and affine automaton. In *Computer Science – Theory and Applications*, (edited by Alexander S. Kulikov and Gerhard J. Woeginger), volume 9691 of *Lecture Notes in Computer Science*, pages 146–160. Springer, Cham, 2016.
- [DCML15] Alejandro Díaz-Caro and Pablo E. Martínez López. Isomorphisms considered as equalities: Projecting functions and enhancing partial application through and implementation of  $\lambda^+$ . In *ACM Proceedings of IFL'15: Symposium on the implementation and application of functional programming languages*, number 9, ACM Digital Library. 2016.
- [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  $\lambda$ -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. Scalar System F for linear-algebraic  $\lambda$ -calculus: Towards a quantum physical logic. 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. Elsevier, 2011.
- [ADCG<sup>+</sup>11] 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.

### 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.
- [DCPT<sup>+</sup>10] Alejandro Díaz-Caro, Simon Perdrix, Christine Tasson, and Benoît Valiron. Equivalence of algebraic  $\lambda$ -calculi. In *5th International Workshop on Higher-Order Rewriting*, Edinburgh, United Kingdom, 2010.

### Submitted papers and drafts

- [DCD16] Alejandro Díaz-Caro and Gilles Dowek. Simply typed lambda-calculus modulo type isomorphisms. `ha1-01109104`, 2016.

## Science popularisation

- [DC16] Alejandro Díaz-Caro ¿Qué es la computación cuántica? *Ciencia Hoy*, 150:40–44, 2016. ISSN 0327-1218.
- [DC12] Alejandro Díaz-Caro Tras las huellas de la computación cuántica. *Ensemble*, 9, 2012. ISSN 1852-5911.

## 4 Teaching

### 2015–2017

*Características de Lenguajes de Programación*. Universidad Nacional de Quilmes. Licenciatura en Informática.

*Matemática III*. Universidad Nacional de Quilmes. Licenciatura en Informática.

*Matemática II*. Universidad Nacional de Quilmes. Licenciatura en Informática.

**2016** *Introducción a la Computación Cuántica y Fundamentos de Lenguajes de Programación*. Universidad Nacional de Rosario. Licenciatura en Ciencias de la Computación, with credits for the PhD.

**2015** *Lenguajes Formales y Autómatas*. Universidad Nacional de Quilmes. Licenciatura en Informática.

*Probabilidad y Estadística aplicada a la Bioinformática*. Universidad Nacional de Quilmes. Maestría en Bioinformática y Biología de Sistemas.

**2014** *Características de Lenguajes de Programación*. Universidad Nacional de Quilmes. Licenciatura en Informática.

*Probabilidad y Estadística aplicada a la Bioinformática*. Universidad Nacional del Noroeste de la Provincia de Buenos Aires. Maestría en Bioinformática y Biología de Sistemas.

**2013–2014** *Probabilités* (TD). Université Paris-Ouest Nanterre La Défense. L2 Économie et gestion.

*Statistiques et probabilités* (TD). Université Paris-Ouest Nanterre La Défense. L2 Économie et droit.

*Méthodologie de la mesure en sciences humaines* (TD). Université Paris-Ouest Nanterre La Défense. L1 Psychologie.

*Mathématiques 2* (TD). Université Paris-Ouest Nanterre La Défense. L1 Économie et gestion.

*Mathématiques 1: Calcul et fonctions* (TD). Université Paris-Ouest Nanterre La Défense. L1 Économie et droit.

**2012–2013** *Statistiques et probabilités* (TD). Université Paris-Ouest Nanterre La Défense. L2 Économie et droit.

*Méthodologie de la mesure en sciences humaines* (TD). Université Paris-Ouest Nanterre La Défense. L1 Psychologie.

*Mathématiques 2* (TD). Université Paris-Ouest Nanterre La Défense. L1 Économie et gestion.

*Mathématiques 1: Calcul et fonctions* (TD). Université Paris-Ouest Nanterre La Défense. L1 Économie et droit.

*Mathématiques 1* (TD). Université Paris-Ouest Nanterre La Défense. L1 Économie et gestion.

**2010** *Calculabilité et complexité* (CM+TD). Institute National Polytechnique de Grenoble ESISAR. Cycle Ingénieur (5th year) Informatique et Réseau.

*Compléments mathématiques et introduction à la logique et la preuve formelle* (TD). Université Joseph Fourier. L1 Informatique.

**2009** *Théorie des graphes* (CM+TD). Institute National Polytechnique de Grenoble ESISAR. Cycle Ingénieur (5th year) Électronique, Informatique, Systèmes.

**2008** *Algebra y Geometría Analítica I* (Ayudante de 1ra). Universidad Nacional de Rosario. Escuela de Formación Básica FCEIA.

*Análisis Matemático I* (Ayudante de 1ra). Universidad Nacional de Rosario. Escuela de Formación Básica FCEIA.

**2007** *Análisis Matemático IV* (Ayudante de 2da). Universidad Nacional de Rosario. Licenciatura en Ciencias de la Computación.

## 5 Responsibilities

### Supervising

#### Licenciatura's Thesis<sup>1</sup>

##### In progress

- Agustín Borgna (Universidad de Buenos Aires, DC-FCEN).
- Ignacio Grima (Universidad Nacional de Rosario, DCC-FCEIA). Co-supervisor: Pablo E. Martínez López.
- Malena Ivinsky (Universidad de Buenos Aires, DC-FCEN). Co-supervisor: Hernán Melgratti.
- Francisco Noriega (Universidad de Buenos Aires, DC-FCEN).
- Juan Pablo Rinaldi (Universidad Nacional de Rosario, DCC-FCEIA).
- Alan Rodas Bonjour (Universidad Nacional de Quilmes, DCT). Co-supervisor: Pablo E. Martínez López.
- Lucas Romero (Universidad de Buenos Aires, DC-FCEN).
- Federico Sawady (Universidad Nacional de Quilmes, DCT). Co-supervising. Supervisor: Pablo E. Martínez López.

##### Defended

- Guido Martínez, *Confluencia en sistemas de reescritura probabilistas*, Licenciatura's Thesis. Universidad Nacional de Rosario, March 27, 2017). Advisor: Alejandro Díaz-Caro. Paper issued: [DCM17]
- Pablo Buiras, *Aproximando los escalares de un  $\lambda$ -cálculo algebraico mediante cotas inferiores*, Licenciatura's Thesis. Universidad Nacional de Rosario, December 14, 2011. Advisor: Alejandro Díaz-Caro, co-advisor: Mauro Jaskelioff. Paper issued: [BDCJ12]

### Committee member

- Member of the Scientific Board of the Thematic Issue on Developments on Logic-based Methods for Intelligent Systems of the international journal *Computación y Sistemas*, published by the *Centro de Investigacion en Computación, IPN, Mexico* (ISSN 2007-9737).
- Member of the Scientific Board of the journal *Ensemble*. Ensemble is the scientific popularisation journal of the *Maison de l'Argentine* at the *Cité Internationale* in Paris. It depends on the Argentine Ministry of Education (ISSN 1852-5911).
- Between January 2013 and August 2014: 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

#### As director

- ECOS-Sud project A17C03 *QuCa: Quantum Calculi*. Argentine director: Alejandro Díaz-Caro. French director: Gilles Dowek. Other permanent members: Pablo Arrighi, Jean-Yves Marion, Pablo E. Martínez López, Simon Perdrix, and Benoît Valiron. 01/2018–12/2020.
- PICT-2015-1208 *Fundamentos de lenguajes de programación cuántica: hacia una lógica computacional*. Director: Alejandro Díaz-Caro. 04/2017–05/2020.

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<sup>1</sup>Argentinean “Licenciatura” is equivalent to the Research Masters in the EU system.

- UNQ project 1370/17 (renewal of PUNQ 1425/15) *Fundamentos de lenguajes de programación y sus consecuencias en sistemas clásicos*.  
Director: Alejandro Díaz-Caro. Co-Director: Pablo E. Martínez López. 05/2017–04/2019.
- 16-STIC-04 *FoQCoSS: Foundations of Quantum Computation: Syntax and Semantics*.  
Argentinian coordinator: Alejandro Díaz-Caro. Brazilian coordinator: Juliana Kaizer Vizzotto. French coordinators: Pablo Arrghi, Gilles Dowek, Simon Perdrix, and Benoît Valiron. 2016–2017.
- UNQ project 1425/15 *Fundamentos de lenguajes de programación y sus consecuencias en sistemas clásicos*.  
Director: Alejandro Díaz-Caro. Co-Director: Pablo E. Martínez López. 05/2015–04/2017.

#### As researcher

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

## 6 Seminars and Workshops

### International workshops

- Alejandro Díaz-Caro y Gilles Dowek. Typing quantum superpositions and measurement. In *Poster session at APLAS*, Suzhou, China, November 27–29, 2017.
- Alejandro Díaz-Caro. Typing quantum superpositions and projective measurements. In *First FoQCoSS Meeting*. Bernal, Argentina. December 5–6, 2016.
- Alejandro Díaz-Caro. Towards a quantum  $\lambda$ -calculus with quantum control. In *V Congreso Latinoamericano de Matemáticos (CLAM 16)*. Barranquilla, Colombia. July 11–15, 2016.
- Alejandro Díaz-Caro. Projective quantum measurement in the lambda calculus. In *Workshop of the INFINIS International Laboratory*. Buenos Aires, Argentina. July 17, 2015.
- Alejandro Díaz-Caro. PCF with pairs and partial evaluation. In *Second Workshop of ANR-NSFC project LOCALI*. Paris, France. November 24–26, 2014.
- 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 Arrghi. 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.
- Pablo Arrghi, Alejandro Díaz-Caro and Benoît Valiron. Subject reduction in a Curry-style polymorphic type system with a vectorial space structure. In *9th Workshop on Quantitative Aspects of Programming Languages*. Saarbrücken, Germany. April, 1–3, 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, Simon Perdrix, Christine Tasson and Benoît Valiron. Equivalence of algebraic  $\lambda$ -calculi. In *5th International Workshop on Higher-Order Rewriting*. Edinburgh, UK, July 14, 2010.
- Alejandro Díaz-Caro and Barbara Petit. An additive type system for the linear-algebraic  $\lambda$ -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.

### Short courses in summer schools

- “31a. Escuela de Ciencias Informáticas”, Exactas-UBA. Buenos Aires, Argentina. July 24–29, 2017.  
Course: *Fundamentos de lenguajes para computación cuántica* — 15hs
- “Escuela de Informática del Congreso Argentino de Ciencias de la Computación”, San Luis, Argentina. October 3–7, 2016.  
Course: *Fundamentos de lenguajes de programación para computación cuántica* — 25hs
- “XIII Jornadas de Ciencias de la Computación”. Rosario, Santa Fe, Argentina. October 22–23, 2015.  
Course: *Introducción a la Computación Cuántica* — 4hs
- “Escuela de Verano de Ciencias Informáticas”. Río Cuarto, Córdoba, Argentina. February 9–14, 2015.  
Course: *Fundamentos de lenguajes de programación cuántica* — 12.5hs

### National workshops

- Alejandro Díaz-Caro. Fundamentos de lenguajes de programación cuánticos. In *Workshop de Técnicas de Programación Científica*. Quilmes, Argentina. February 26 to March 9, 2018.
- Alejandro Díaz-Caro. Control cuántico en lenguajes de programación. In *IV Jornada de Lógica, Computación e Información Cuántica*. Quilmes, Argentina. March 1, 2018.
- Alejandro Díaz-Caro. Fusionando paradigmas de lenguajes de programación cuánticos. In *XV Jornadas de Ciencias de la Computación*. Rosario, Argentina. October 25–27, 2017.
- Alejandro Díaz-Caro and Gilles Dowek. Lambda cálculo modulo isomorfismos de tipos. In *XII Jornadas de Ciencias de la Computación*. Rosario, Argentina. October 15–17, 2014.
- 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  $\lambda$ -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  $\lambda$ -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. Brevisima 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. Brevisima introducción a la computación cuántica. In *IV Jornadas de Ciencias de la Computación*. Rosario, Argentina. October 26–27, 2006.
- Alejandro Díaz-Caro. Teleportación cuántica. In *III Jornadas de Ciencias de la Computación*. Rosario, Argentina. December 6–7, 2005.

## Given seminars<sup>2</sup>

- Calculo lambda y computación cuántica. Universidad Nacional de La Plata. IFLP. La Plata, Argentina. April 25, 2017.
- A lambda calculus for density matrices. ENS Cachan. DEDUCTEAM (LSV), Cachan, France. April 6, 2017.
- Affine computation and affine automaton. Dipartimento di Informatica. Università degli studi di Torino. Turin, Italy. June 7, 2016.
- Quantum superpositions and projective measurement in the lambda calculus. Dipartimento di Informatica. Università degli studi di Torino. Turin, Italy. January 28, 2016.
- Sobre la medición cuántica proyectiva. Universidad Nacional de Rosario. FCEIA. Rosario, Argentina. June 16, 2015.
- Works in progress in type theory modulo type isomorphisms. Inria. DEDUCTEAM (Paris-Rocquencourt), Paris, France. May 29, 2015.
- Teoría de tipos módulo isomorfismos. Universidad Nacional de Quilmes. LoReL. Bernal, Argentina. October 1, 2014.
- 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, Argentina. 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.

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<sup>2</sup>Non exhaustive list



- Vectorial System F. Université de Savoie. LIMD, (LAMA). Chámbery, France. May 18, 2009.
- 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.