

# Curriculum Vitæ

## Alejandro DÍAZ-CARO

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### 1 Current positions

SINCE 01/OCT/2024

#### **Advanced Research Position**

Institution: Inria

Affiliated to the team Mocqua at the Loria laboratory (Nancy, France)

SINCE 11/AUG/2014

#### **Tenured Assistant Professor**

*“Profesor Adjunto”*

Institution: Universidad Nacional de Quilmes (Argentina)

### 2 Previous permanent position

01/JUL/2016 – 30/SEP/2024

#### **Tenured Researcher**

*“Investigador Asistente” between Jul/2016 and Nov/2020*

*“Investigador Adjunto” between Nov/2020 and Sep/2024*

Institution: CONICET (Argentina)

Affiliated to Instituto de Ciencias de la Computación (Universidad de Buenos Aires).

### 3 Previous non-permanent positions

1/MAR/2024 – 31/JUL/2024

#### **Assistant Professor**

*“Profesor Adjunto con Dedicación Parcial”*

Institution: Universidad de Buenos Aires (Argentina)

10/MAY/2024 – 9/JUN/2024

#### **Invited researcher**

Institution: Université CentraleSupélec (France)

22/JUN/2023 – 21/JUL/2023

#### **Invited researcher**

Institution: Inria Paris-Saclay (France)

24/APR/2023 – 31/MAY/2023

#### **Invited researcher**

Institution: Université CentraleSupélec (France)

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**

Main Institution: Université Paris 13 (France)  
Secondary institution: Inria Paris-Rocquencourt  
Laboratory: Laboratoire d'Informatique de Paris-Nord  
Funding: DIGITEO Consortium, Région Île-de-France through project 2011-070D "ALAL"  
Main researchers: Michele Pagani (Université Paris 13) and Gilles Dowek (Inria)

## 4 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)  
Advisor: Pablo Arrighi – Co-advisor: Frédéric Prost  
Funding:  
*Allocation de Recherche* granted by the Ministère de l'Enseignement Supérieur et de la Recherche

- **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

## 5 Publications

### Editorial work

[DCZ24] Alejandro Díaz-Caro and Vladimir Zamdzhiev. Proceedings of the 21st International Conference on Quantum Physics and Logic. *Electronic Proceedings in Theoretical Computer Science* 406, 2024.

### International referred publications

- [DCV24] Alejandro Díaz-Caro and Marcos Villagra. Classically time-controlled quantum automata. *The Computer Journal*, bxae089, 2024.
- [DCDI<sup>+</sup>24] Alejandro Díaz-Caro, Gilles Dowek, Malena Ivniisky, and Octavio Malherbe. A linear proof language for second-order intuitionistic linear logic. In *Logic, Language, Information and Computation*, (edited by George Metcalfe, Thomas Studer, and Ruy de Queiroz), volume 14672 of *Lecture Notes in Computer Science*, pages 18–35, Springer, Cham, 2024.
- [DCD24] Alejandro Díaz-Caro and Gilles Dowek. A linear linear lambda-calculus. *Mathematical Structures in Computer Science*, FirstView:1-35, 2024.
- [DCM23] Alejandro Díaz-Caro and Octavio Malherbe. A concrete model for a typed linear algebraic lambda calculus. *Mathematical Structures in Computer Science* (34):1–40. 2023.
- [DCD23] Alejandro Díaz-Caro and Gilles Dowek. Extensional proofs in a propositional logic modulo isomorphisms. *Theoretical Computer Science* 977:114172, 2023.
- [DCD23b] Alejandro Díaz-Caro and Gilles Dowek. A new connective in natural deduction, and its application to quantum computing. *Theoretical Computer Science* 957:113840, 2023.
- [DCM22] Alejandro Díaz-Caro and Octavio Malherbe. Quantum control in the unitary sphere: Lambda- $\mathcal{S}_1$  and its categorical model. *Logical Methods in Computer Science* 18(3:32), 2022.

- [DCD22] Alejandro Díaz-Caro and Gilles Dowek. Linear lambda-calculus is linear. In *7th International Conference on Formal Structures for Computation and Deduction*, (edited by Amy Felty), volume 282 of *Leibniz International Proceedings in Informatics (LIPIcs)*, article 22. Schloss Dagstuhl–Leibniz-Zentrum fuer Informatik, 2022.
- [DC21] Alejandro Díaz-Caro. A quick overview on the quantum control approach to the lambda calculus. In *Logical and Semantic Frameworks with Application*, (edited by Mauricio Ayala-Rincon and Eduardo Bonelli), volume 357 of *Electronic Proceedings in Theoretical Computer Science*, pages 1–17. Open Publishing Association, 2021.
- [RDC21] Rafael Romero and Alejandro Díaz-Caro. A note on confluence in typed probabilistic lambda calculi. In *Logical and Semantic Frameworks with Application*, (edited by Mauricio Ayala-Rincon and Eduardo Bonelli), volume 357 of *Electronic Proceedings in Theoretical Computer Science*, pages 18–24. Open Publishing Association, 2021.
- [DCD21] Alejandro Díaz-Caro and Gilles Dowek. A new connective in natural deduction, and its application to quantum computing. In *18th International Colloquium on Theoretical Aspects of Computing*, (edited by Antonio Cerone and Peter Ölveczky), volume 12819 of *Lecture Notes in Computer Science*, pages 175–193. Springer, Cham, 2021 (Best Paper Award).
- [SDCM<sup>+</sup>20] Cristian F. Sottile, Alejandro Díaz-Caro, and Pablo E. Martínez López. Polymorphic System I. In *IFL 2020: Proceedings of the 32nd Symposium on implementation and application of functional programming languages*, pages 127–137, *ACM Digital Library*. 2020.
- [DCM20] Alejandro Díaz-Caro and Octavio Malherbe. A categorical construction for the computational definition of vector spaces. In *Applied Categorical Structures* 28(5):807–844, Springer, 2020.
- [ADC20] Beniamino Accattoli and Alejandro Díaz-Caro. Functional Pearl: The Distributive  $\lambda$ -Calculus. In *15th International Symposium on Functional and Logic Programming*, (edited by Keisuke Nakano and Konstantinos Sagonas), volume 12073 of *Lecture Notes in Computer Science*, pages 33–49. Springer, Cham, 2020.
- [DCDR19] Alejandro Díaz-Caro, Gilles Dowek, and Juan Pablo Rinaldi. Two linearities for quantum computing in the lambda calculus. *BioSystems* 186:104012 (special issue on *Theory and Practice of Natural Computing*), 2019.
- [DCD19] Alejandro Díaz-Caro and Gilles Dowek. Proof Normalisation in a Logic Identifying Isomorphic Propositions. In *4th International Conference on Formal Structures for Computation and Deduction*, (edited by Herman Geuvers), volume 131 of *Leibniz International Proceedings in Informatics (LIPIcs)*, article 14. Schloss Dagstuhl–Leibniz-Zentrum fuer Informatik, 2019.
- [DCGM<sup>+</sup>19] Alejandro Díaz-Caro, Mauricio Guillermo, Alexandre Miquel, and Benoît Valiron. Realisability in the Unitary Sphere. In *34th Annual ACM/IEEE Symposium on Logic in Computer Science (LICS'19)*, pages 1–13, 2019.
- [DCV18] Alejandro Díaz-Caro and Marcos Villagra. Classically time-controlled quantum automata. In *7th International Conference on the Theory and Practice of Natural Computing*, (edited by Carlos Martín-Vide, Michael O’Neill, and Miguel A. Vega-Rodríguez), volume 11324 of *Lecture Notes in Computer Science*, pages 226–278. Springer, Cham, 2018.
- [DCM18] Alejandro Díaz-Caro and Octavio Malherbe. A concrete categorical semantics for Lambda-S. In *13th Workshop on Logical and Semantic Frameworks with Applications*, (edited by Beniamino Accattoli and Carlos Olarte), volume 344 of *Electronic Notes in Theoretical Computer Science*, pages 83–100. Elsevier, 2019.
- [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*, (Edited by Sandra Alves and Renata Wassermann), volume 388 of *Electronic Notes in Theoretical Computer Science*, pages 115–131. Elsevier, 2018.
- [ADCV17] Pablo Arrighi, Alejandro Díaz-Caro, and Benoît Valiron. The vectorial lambda-calculus. *Information & Computation*, 254(1):105-139, 2017.
- [CDC<sup>+</sup>17] Mario Coppo, Mariangiola Dezani-Ciancaglini, Alejandro Díaz-Caro, Ines Margaria, and Maddalena 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.
- [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.
- [DCD14] 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.
- [DCD13] 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.
- [ADC12] Pablo Arrighi and Alejandro Díaz-Caro. A System F accounting for scalars. *Logical Methods in Computer Science*, 8(1:11), 2012.
- [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.

## 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 workshops without proceedings

- [DCDM24] Alejandro Díaz-Caro, Gilles Dowek, and Octavio Malherbe. From Linear Logic to quantum control. Extended abstract at *21st International Conference on Quantum Physics and Logic (QPL)*, Buenos Aires, Argentina, 2024.
- [DCDI<sup>+</sup>24] Alejandro Díaz-Caro, Gilles Dowek, Malena Ivnisky, and Octavio Malherbe. Polymorphic intuitionistic linear logic and its connection to quantum computing. Poster presentation at *21st International Conference on Quantum Physics and Logic (QPL)*, Buenos Aires, Argentina, 2024.
- [DCMR24] Alejandro Díaz-Caro, Octavio Malherbe, and Rafael Romero. A multiple-basis quantum lambda calculus. Poster presentation at *21st International Conference on Quantum Physics and Logic (QPL)*, Buenos Aires, Argentina, 2024.
- [SDC24] Carlos Miguel Soto and Alejandro Díaz-Caro. Soundness and Completeness for a Linear Logic Calculus Designed for Quantum Computing. Poster presentation at *21st International Conference on Quantum Physics and Logic (QPL)*, Buenos Aires, Argentina, 2024.
- [MDC24] Nicolás Monzón and Alejandro Díaz-Caro. An extension of Lambda-S for multiple basis. Poster presentation at *21st International Conference on Quantum Physics and Logic (QPL)*, Buenos Aires, Argentina, 2024.
- [DCHP<sup>+</sup>24] Alejandro Díaz-Caro, Emmanuel Hainry, Romain Péchoux, and Mário Silva. A feasible and unitary programming language with quantum control (work-in-progress). Extended abstract at *4th International Workshop on Programming Languages for Quantum Computing (PLanQC 2024)*, London, UK, 2024.
- [DCHP<sup>+</sup>23] Alejandro Díaz-Caro, Emmanuel Hainry, Romain Péchoux, and Mário Silva. Light types and polynomial time for quantum lambda-calculi. Poster presentation at *20th International Conference on Quantum Physics and Logic (QPL)*, Paris, France, 2023.
- [DCDI<sup>+</sup>23] Alejandro Díaz-Caro, Gilles Dowek, Malena Ivnisky, and Octavio Malherbe. Polymorphic  $\mathcal{L}^S$ -calculus. Poster at *6th Workshop on Women in Logic (WiL)*, Rome, Italy, 2023.
- [DCD22a] Alejandro Díaz-Caro and Gilles Dowek. Linear lambda calculus is linear. Extended abstract at *28th International Conference on Types for Proofs and Programs (TYPES)*, Nantes, France, 2022.
- [DCIM21a] Alejandro Díaz-Caro, Malena Ivnisky, Hernán Melgratti, and Benoît Valiron. A finite-dimensional model for affine, linear quantum lambda calculi with general recursion. Extended abstract at *27th International Conference on Types for Proofs and Programs (TYPES)*, Leiden, The Netherlands (virtual), 2021.
- [DCIM<sup>+</sup>21b] Alejandro Díaz-Caro, Malena Ivnisky, Hernán Melgratti, and Benoît Valiron. A finite-dimensional model for affine, linear quantum lambda calculi with general recursion. Extended abstract at *5th Workshop on Women in Logic (WiL)*, Rome, Italy (virtual), 2021.

- [DCD21b] Alejandro Díaz-Caro and Gilles Dowek. A new connective in natural deduction, and its application to quantum computing. Poster presentation at *18th International Conference on Quantum Physics and Logic (QPL)*, Gdańsk, Poland (virtual), 2021.
- [DCM21] Alejandro Díaz-Caro and Octavio Malherbe. Quantum control in the unitary sphere:  $\Lambda$ - $\mathcal{S}_1$  and its categorical model. Poster presentation at *18th International Conference on Quantum Physics and Logic (QPL)*, Gdańsk, Poland (virtual), 2021.
- [ODC20] Federico Olmedo and Alejandro Díaz-Caro. Extended abstract: Runtime Analysis of Quantum Programs: A Formal Approach. Extended abstract at *1st International Workshop on Programming Languages for Quantum Computing (PLanQC 2020)*, New Orleans, Louisiana, United States, 2020.
- [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.

## Drafts and submitted papers

- [DCM24a] Alejandro Díaz-Caro and Octavio Malherbe. Parallel and algebraic lambda-calculi in intuitionistic propositional logic. [arXiv:2408.16102](https://arxiv.org/abs/2408.16102), 2024.
- [DCHP<sup>+</sup>24] Alejandro Díaz-Caro, Emmanuel Hainry, Romain Péchoux, and Mário Silva. A feasible and unitary programming language with quantum control. [hal-04266203](https://arxiv.org/abs/2404.04266), 2024.
- [DCM24b] Alejandro Díaz-Caro and Octavio Malherbe. The sup connective in IMALL: A categorical semantics [arXiv:2205.02142](https://arxiv.org/abs/2205.02142), 2024.

## Science popularisation

- [DC24] Alejandro Díaz-Caro. Lógica y computación cuántica: Un camino a través de los vaivenes políticos de la Argentina. *Bits de Ciencia*, 26:20–25, 2024. ISSN 0718–8005 (print) 0717–8013 (online).
- [DC16] Alejandro Díaz-Caro. ¿Qué es la computación cuántica? *Ciencia Hoy*, 150:40–44, 2016. ISSN 0327-1218 (print) 1666–5171 (online).
- [DC12] Alejandro Díaz-Caro. Tras las huellas de la computación cuántica. *Ensemble*, 9, 2012. ISSN 1852-5911 (online).

## 6 Responsibilities

### Management responsibilities

- Head of the LoReL research team (<http://lorel-team.github.io>) between 2015 and 2024.
- Adjoint research secretary at Departamento de Computación, Universidad de Buenos Aires, between 2019 and 2024.
- Representative of Universidad Nacional de Quilmes at RedUNCI (the Network of National Universities with Informatics Degrees), between 2015 and 2024.

## Supervising

### PhD Theses

- Malena Ivinsky. Universidad de Buenos Aires, UBA scholarship.  
Coadvisor: Octavio Malherbe (UdelaR).
- Rafael Romero. Universidad de Buenos Aires, CONICET scholarship.  
Coadvisor: Octavio Malherbe (UdelaR).
- Cristian Sottile. Universidad de Buenos Aires, CONICET scholarship.  
Coadvisor: Pablo E. Martínez López (UNQ).

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

#### In progress

- Luciano Barletta (Universidad Nacional de Rosario, DCC-FCEIA).
- Nicolás Monzón (Universidad Argentina de la Empresa).
- Tomás Miguez. (Universidad de Buenos Aires, DC-FCEN).
- Álvaro Piorno (Universidad Nacional de Quilmes).
- Carlos Miguel Soto (Universidad de Buenos Aires, DC-FCEN).

#### Defended

- Martín Villagra. *Compilación del lambda cálculo con matrices densidad en la máquina cuántica IBM-Q*. Licenciatura's Thesis. Universidad Nacional de Rosario, December 20, 2023. Coadvisor: Pablo E. Martínez López.
- Nicolás San Martín. *Operador de medición en un cálculo lambda con control cuántico*. Licenciatura's Thesis. Universidad de Buenos Aires, August 3, 2023. Coadvisor: P. E. Martínez López.
- Malena Ivinsky. *Agregando punto fijo a una extensión cuántica de lambda cálculo con matrices de densidad*. Licenciatura's Thesis. Universidad de Buenos Aires, August 28, 2020. Coadvisor: H. Melgratti. Paper issued: [DCIM21a].
- Francisco Noriega. *The Vectorial lambda calculus revisited*. Licenciatura's Thesis. Universidad de Buenos Aires, May 4, 2020. Preprint produced: [arXiv:2007.03648](https://arxiv.org/abs/2007.03648)
- Rafael Romero. *Una extensión polimórfica para los  $\lambda$ -cálculos cuánticos  $\lambda_\rho$  y  $\lambda_\rho^\circ$* . Licenciatura's Thesis. Universidad de Buenos Aires, March 19, 2020. Paper issued: [RDC21].
- Cristian Sottile. *Agregando polimorfismo a una lógica que identifica proposiciones isomorfas*. Licenciatura's Thesis. Universidad Nacional de La Plata, March 10, 2020. Coadvisor: P. E. Martínez López. Paper issued: [SDCM+20]
- Agustín Borgna. *Simulación del lambda cálculo de matrices de densidad en el lambda cálculo cuántico de Selinger y Valiron*. Licenciatura's Thesis. Universidad de Buenos Aires, August 1st, 2019.
- Juan Pablo Rinaldi. *Demostrando normalización fuerte sobre una extensión cuántica del lambda cálculo*. Licenciatura's Thesis. Universidad Nacional de Rosario, June 27, 2018. Paper issued: [DCDR19]
- Guido Martínez. *Confluencia en sistemas de reescritura probabilistas*. Licenciatura's Thesis. Universidad Nacional de Rosario, March 27, 2017. 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. Coadvisor: M. Jaske-lioff. Paper issued: [BDCJ12]

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

## Direction of research projects

- HORIZON-MSCA-2023-SE 101182520 *QCOMICAL: Quantum Computing and Its Calculi*. South American Coordinator: Alejandro Díaz-Caro. European Coordinator: Benoît Valiron. 13 participating sites from Argentina, Uruguay, France, and Italy. 12/2024–11/2028.
- PICT-2021-I-A-00090 *Computación cuántica y sus cálculos*. Director: Alejandro Díaz-Caro. 2023–2026.
- PIP 11220200100368CO *Fundamentos de lenguajes para computación cuántica y consecuencias en sistemas clásicos*. Director: Alejandro Díaz-Caro. 2021–2023.
- 21-STIC-10 *Qapla': Quantum Aspects of Programming Languages*. International and Argentinian coordinator: Alejandro Díaz-Caro. Chilean coordinator: Federico Olmedo. Uruguayan coordinator: Octavio Malherbe. French coordinators: Pablo Arrghi, Gilles Dowek, Simon Perdrix, and Benoît Valiron. 2021–2022.
- UNQ project 1342/19 *Fundamentos de lenguajes de programación: sistemas de pruebas y computación cuántica*. Director: Alejandro Díaz-Caro. Co-Director: Pablo E. Martínez López. 05/2019–04/2022.
- ECOS-Sud project A17C03 *QuCa: Quantum Calculi*. Argentine director: Alejandro Díaz-Caro. French director: Gilles Dowek. Other permanent members: Pablo Arrghi, Jean-Yves Marion, Pablo E. Martínez López, Simon Perdrix, and Benoît Valiron. 01/2018–12/2020. Extended until 12/2021.
- PICT-2015-1208 *Fundamentos de lenguajes de programación cuántica: hacia una lógica computacional*. Director: Alejandro Díaz-Caro. 04/2017–05/2020.
- 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.

## Participation in Steering/Conference/Programm Committees

- *5th International Workshop on Programming Languages for Quantum Computing (PLanQC 2025)*. Program Committee member.
- *22th International Conference on Quantum Physics and Logic (QPL 2025)*. Program Co-Chair.
- *21th International Conference on Quantum Physics and Logic (QPL 2024)*. Conference and Program Chair.
- *International Conference on Formal Structures for Computation and Deduction (FSCD)*. Steering Committee member for the period 2021–2024.
- *9th International Conference on Formal Structures for Computation and Deduction (FSCD 2024)*. Program Committee member.
- *31th EACSL Annual Conference on Computer Science Logic (CSL 2023)*. Program Committee member.



- *17th and 18th International Workshop on Logical and Semantics Frameworks, with Applications (LSFA 2022 and 2023).*  
Program Committee member.
- *25th to 27th Brazilian Symposium on Programming Languages (SBLP 2021 to 2023).*  
Program Committee member.
- *34a Escuela de Ciencias Informáticas (ECI 2021).*  
School Chair.
- *6th International Conference on Formal Structures for Computation and Deduction (FSCD 2021).*  
Conference chair.
- *17th to 20th International Conference on Quantum Physics and Logic (QPL 2020 to 2023).*  
Program Committee member.
- *8th to 11th International Workshop on Confluence (IWC 2019 to 2022).*  
Program Committee member.
- *V Concurso Latinoamericano de Tesis de Doctorado de CLEI 2019.*  
Program Committee member.

## 7 Teaching experience

### Universidad Nacional de Quilmes

- *Introducción a la Programación Cuántica.*  
Licenciatura en Informática. 2021.
- *Fundamentos de Informática.*  
Doctorado en Ciencia y Tecnología. 2020.
- *Lógica y Programación.*  
Licenciatura en Informática. 2020, 2023, 2024.
- *Probabilidad y Estadística aplicada a la Bioinformática.*  
Maestría en Bioinformática y Biología de Sistemas. 2015, 2020, 2023.
- *Lenguajes Formales y Autómatas.*  
Licenciatura en Informática. 2015, 2019.
- *Matemática II.*  
Licenciatura en Informática. 2015–2019.
- *Matemática III.*  
Licenciatura en Informática. 2015–2017.
- *Características de Lenguajes de Programación.*  
Licenciatura en Informática. 2014–2024.

### Universidad de Buenos Aires

- *Paradigmas de Programación.*  
Licenciatura en Ciencias de la Computación. 2024.
- *Fundamentos de Lenguajes para Computación Cuántica.*  
Licenciatura y Doctorado en Ciencias de la Computación. 2022.

### Universidad Nacional del Noroeste de la Provincia de Buenos Aires

- *Probabilidad y Estadística aplicada a la Bioinformática.*  
Maestría en Bioinformática y Biología de Sistemas. 2014, 2018, 2021.

## Universidad Nacional de Rosario

- *Introducción a la Computación Cuántica y Fundamentos de Lenguajes de Programación*. Licenciatura and Doctorado en Ciencias de la Computación. 2016, 2018.
- *Algebra y Geometría Analítica I* (ayudante de 1a). Escuela de Formación Básica FCEIA. 2008.
- *Análisis Matemático I* (ayudante de 1a). Escuela de Formación Básica FCEIA. 2008.
- *Análisis Matemático IV* (ayudante de 2a). Licenciatura en Ciencias de la Computación. 2007.

## Université Paris-Ouest Nanterre La Défense

- *Probabilités* (TD). L2 Économie et gestion. 2013, 2014.
- *Statistiques et probabilités* (TD). L2 Économie et droit. 2014.
- *Méthodologie de la mesure en sciences humaines* (TD). L1 Psychologie. 2013, 2014.
- *Mathématiques 2* (TD). L1 Économie et gestion. 2013, 2014.
- *Mathématiques 1: Calcul et fonctions* (TD). L1 Économie et droit. 2012, 2013.
- *Mathématiques 1* (TD). L1 Économie et gestion. 2012.

## Université Joseph Fourier

- *Compléments mathématiques et introduction à la logique et la preuve formelle* (TD). L1 Informatique. 2010.

## Institut National Polytechnique de Grenoble ESISAR

- *Calculabilité et complexité* (CM+TD). Cycle Ingénieur (5o año) Informatique et Réseau. 2010.
- *Théorie des graphes* (CM+TD). Cycle Ingénieur (5o año) Électronique, Informatique, Systèmes. 2009.

## Short courses in summer schools

- Virtual course for the Argentinian Informatics Society (SADIO). April 2021.  
Course: *Introducción a la computación cuántica* – 30hs.
- Extracurricular course for Universidad Nacional de La Pampa. October/November, 2020.  
Course: *Introducción a la computación cuántica* – 9hs
- Course for a local enterprise (Terragene). August/September, 2020.  
Course: *Computación cuántica: Estado actual, lenguajes y perspectivas* – 8hs
- “XI Summer Workshop in Mathematics”, Universidade de Brasília, Brazil. February 18–22, 2019.  
Course: *Foundations of quantum programming languages* — 3hs
- “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