Curriculum Vitae

Renaud Vilmart

Born on September the 9th, 1993, in Reims (France).

1 Curriculum Vitae

1.1 Background

2019-2020	Postdoc, LRI, Université Paris Sud.
2016-2019	Ph.D. Thesis in computer science, Loria, Université de Lorraine.
2015-2016	M.Sc. in formal methods, Université de Lorraine.
2013-2016	Engineering degree: "Ingénieur Civil des Mines", École des Mines de Nancy. Double diploma with the M.Sc.
2011-2013	Classe Préparatoire aux Grandes Écoles (CPGE), lycée Clemenceau, Reims. Coursework for preparing the entrance exam to engineering schools.
2011	Baccalauréat scientifique, Lycée Libergier, Reims. Equ. A levels, with honours (mention très bien).

1.2 Experiences

2016-2019	Ph.D. Thesis, Loria, Nancy : *ZX-Calculi for Quantum Computing and their Completeness.* Supervised by Emmanuel Jeandel and Simon Perdrix. Defended on Septembre, 19$^{\text{th}}$ 2019.
2016	Graduation internship (6 month), Loria, Nancy : *Étude d'un langage graphique permettant de calculer et raisonner en quantique.* *Extension du langage aux évolutions quantiques à coefficients réels.* and *Y-Calculus : An Extension of the ZX-Calculus for Real Matrices.* Supervised by Emmanuel Jeandel and Simon Perdrix, followed by a Ph.D. Thesis.
2015	Internship (3 month), Euranova, Mont-St-Guibert: *Development and deployment of a document generation application.* Supervised by Jehan Bruggeman

2 Publications and Talks

2.1 International Journals

[1] Emmanuel Jeandel, Simon Perdrix, and Renaud Vilmart. Completeness of the ZX-calculus, 2019. (40p + app. 30p) Article to appear in LMCS (Selected Papers of the Thirty-Third Annual ACM/IEEE Symposium on Logic in Computer Science (LICS 2018)).

2.2 International Conferences

[2] Titouan Carette, Emmanuel Jeandel, Simon Perdrix, and Renaud Vilmart. Completeness of Graphical Languages for Mixed States Quantum Mechanics. In Christel Baier, Ioannis Chatzigiannakis, Paola Flocchini, and Stefano Leonardi, editors, *46th International Colloquium on Automata, Languages, and Programming (ICALP 2019)*, volume 132 of *Leibniz International Proceedings in Informatics (LIPIcs)*, pages 108:1–108:15, Dagstuhl, Germany, 2019. Schloss Dagstuhl–Leibniz-Zentrum fuer Informatik.

[3] Emmanuel Jeandel, Simon Perdrix, and Renaud Vilmart. A complete axiomatisation of the ZX-calculus for Clifford+T quantum mechanics. In *Proceedings of the 33rd Annual ACM/IEEE Symposium on Logic in Computer Science*, LICS '18, pages 559–568, New York, NY, USA, 2018. ACM.

[4] Emmanuel Jeandel, Simon Perdrix, and Renaud Vilmart. Diagrammatic reasoning beyond Clifford+T quantum mechanics. In *Proceedings of the 33rd Annual ACM/IEEE Symposium on Logic in Computer Science*, LICS '18, pages 569–578, New York, NY, USA, 2018. ACM.

[5] Emmanuel Jeandel, Simon Perdrix, and Renaud Vilmart. Y-calculus: A language for real matrices derived from the zx-calculus. In Bob Coecke and Aleks Kissinger, editors, *Proceedings 14th International Conference on Quantum Physics and Logic, Nijmegen, The Netherlands, 3-7 July 2017*, volume 266 of *Electronic Proceedings in Theoretical Computer Science*, pages 23–57, 2018.

[6] Emmanuel Jeandel, Simon Perdrix, and Renaud Vilmart. A generic normal form for zx-diagrams and application to the rational angle completeness. In *2019 34th Annual ACM/IEEE Symposium on Logic in Computer Science (LICS)*, pages 1–10, June 2019.

[7] Emmanuel Jeandel, Simon Perdrix, Renaud Vilmart, and Quanlong Wang. ZX-calculus: Cyclotomic supplementarity and incompleteness for Clifford+T quantum mechanics. In Kim G. Larsen, Hans L. Bodlaender, and Jean-Francois Raskin, editors, *42nd International Symposium on Mathematical Foundations of Computer Science (MFCS 2017)*, volume 83 of *Leibniz International Proceedings in Informatics (LIPIcs)*, pages 11:1–11:13, Dagstuhl, Germany, 2017. Schloss Dagstuhl–Leibniz-Zentrum fuer Informatik.

[8] Renaud Vilmart. A near-minimal axiomatisation of ZX-calculus for pure qubit quantum mechanics. In *2019 34th Annual ACM/IEEE Symposium on Logic in Computer Science (LICS)*, pages 1–10, June 2019.

[9] Renaud Vilmart. A ZX-calculus with triangles for Toffoli-Hadamard, Clifford+T, and beyond. In Peter Selinger and Giulio Chiribella, editors, *Proceedings of the 15th International Conference on Quantum Physics and Logic, Halifax, Canada, 3-7th June 2018*, volume 287 of *Electronic Proceedings in Theoretical Computer Science*, pages 313–344, 2019.

2.3 Ph.D. Thesis

[10] Renaud Vilmart. *ZX-Calculi for Quantum Computing and their Completeness*. Theses, Université de Lorraine, September 2019. https://hal.archives-ouvertes.fr/tel-02395443.

2.4 Internship Reports

[11] Renaud Vilmart. Y-calculus : An extension of the ZX-calculus for real matrices. Master's thesis, Master Logiciels : Méthodes Formelles et Ingénierie (LMFI) – Université de Lorraine, 2016.

[12] Renaud Vilmart. Étude d'un langage graphique permettant de calculer et raisonner en quantique. extension du langage aux évolutions quantiques à coefficients réels. Master's thesis, Mines de Nancy – Université de Lorraine, 2016.

2.5 Workshops and Meetings

- QIP (Quantum Information Processing), 2019

- ZX meeting, 2019

- JIQ (Journées Informatique Quantique), 2018

- ZX meeting, 2018

- SoftQPro ANR meeting, 2018

- JIQ, 2017

- Poster at Journées du GDRIM, 2017

- FOQCOSS (Foundations of Quantum Computation: Syntax and Semantics), 2016

- Poster at GDRIQFA (Quantum Engineering, from Fundamental Aspects to Applications), 2016

2.6 Invited Seminars

- LIG, Grenoble, 22/01/20

- LACL, Créteil, 19/02/18

2.7 Participation in the Reviewing Process

- Compositionality, 2018

- QIP, 2019

- QPL (Quantum Physics and Logics), 2019

- QPL, 2018

- FSCD (Formal Structures for Computation and Deduction), 2018

2.8 Award

- Kleene Award 2019: Best student paper award for a LiCS paper [8].

3 Teachings

- CNRS training course on ZX-Calculus

- Practical work on algorithmic and programming (1st and 2nd year Bachelor)

- Practical work on C2I: a degree for office automation (1st year Bachelor)

- Practical work on software for professionals (2nd year Bachelor – design of the sessions)