CURRICULUM VITÆ – COLE COMFORT

PERSONAL INFORMATION

Full Name:	Cole Robert Comfort
Work Address:	Laboratoire Méthodes Formelles, 91190, Gif-sur-Yvette, France
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Website:	`https://colecomfort.github.io/`

EDUCATION

Doctorate of Philosophy, Computer Science, Clarendon Scholar *October 2019–October 2023*

University of Oxford, United Kingdom
Supervisors: Drs. Aleks Kissinger and Bob Coecke
Thesis Title: *A Diagrammatic Approach to Networks of Spans and Relations*

Thesis Based Master of Science, Computer Science *September 2017–July 2019*

University of Calgary, Canada
Supervisor: Dr. Robin Cockett
Thesis Title: *Classifying reversible logic gates with ancillary bits*
GPA Received: 4.000/4.000

Bachelor of Science (Honours) First Class, Computer Science *September 2013–June 2017*

University of Calgary, Canada
Minor: Pure Mathematics
Concentration: Algorithms and Complexity Theory
Supervisor: Dr. Robin Cockett
Thesis Title: *The Category CNOT*
GPA Received: 3.735/4.000

EMPLOYMENT

Postdoctoral Scholar (joint project)

Équipe QUACS, Université Paris-Saclay, *December 2024–November 2026*
CNRS, ENS Paris-Saclay, Inria, Laboratoire Méthodes Formelles, 91190, Gif-sur-Yvette, France.

Équipe MOCQUA, Université de Lorraine, *October 2023–November 2024*
CNRS, Inria, LORIA, F 54000 Nancy, France

Researcher *September 2021–January 2022*

Tallinn Insitute of Technology, Tallinn, Estonia
Supervisor: Dr. Paweł Sobociński

Research Assistant *September 2017–April 2019*

Department of Computer Science, University of Calgary, Canada

Summer Student Software Developer *May 2016–August 2016*

City of Calgary, Canada

RESEARCH

Conference Publications

[1] J. Hefford and C. Comfort, "Coend optics for quantum combs," p. 63–76, Aug. 2023. [Online]. Available: http://dx.doi.org/10.4204/EPTCS.380.4

[2] C. Comfort and A. Kissinger, "A graphical calculus for lagrangian relations," *Electronic Proceedings in Theoretical Computer Science*, vol. 372, pp. 338–351, Nov. 2022. [Online]. Available: https://doi.org/10.4204/eptcs.372.24

[3] C. Comfort, "The ZX&-calculus: A complete graphical calculus for classical circuits using spiders (best student paper)," vol. 340. Open Publishing Association, 2021, pp. 60–90. [Online]. Available: https://doi.org/10.4204/eptcs.340.4

[4] J. Cockett and C. Comfort, "The category TOF," vol. 287. Open Publishing Association, 2019, pp. 67–84. [Online]. Available: https://doi.org/10.4204/eptcs.287.4

[5] R. Cockett, C. Comfort, and P. Srinivasan, "The category CNOT," vol. 266. Open Publishing Association, 2018, pp. 258–293. [Online]. Available: https://doi.org/10.4204/eptcs.266.18

Journal Articles

[6] J. Cockett, C. Comfort, and P. Srinivasan, "Dagger linear logic for categorical quantum mechanics," *Logical Methods in Computer Science*, vol. Volume 17, Issue 4, Nov. 2021. [Online]. Available: https://doi.org/10.46298/lmcs-17(4:8)2021

Preprints and Submitted Articles

[7] R. I. Booth, T. Carette, and C. Comfort, "Complete equational theories for classical and quantum gaussian relations," 2024. [Online]. Available: https://arxiv.org/abs/2403.10479

[8] ——, "Graphical symplectic algebra," 2024. [Online]. Available: https://arxiv.org/abs/2401.07914

[9] C. Comfort, "The algebra for stabilizer codes (best student paper, qpl 2023)," 2023. [Online]. Available: https://arxiv.org/abs/2304.10584

[10] C. Comfort, A. Delpeuch, and J. Hedges, "Sheet diagrams for bimonoidal categories," 2020. [Online]. Available: https://arxiv.org/abs/2010.13361

RESEARCH FUNDING

Clarendon Fund Scholar *October 2019-October 2023*

Awarded by the Oxford University Press for my doctoral studies.
Highly competitive: only awarded to two computer science doctoral students per year.

Mitacs Globalink Research Award *September 2018-December 2018*

Project Title: Investigating Infinite Dimensional Models of Quantum Computation

Visited the University of Oxford From September 1st to November 30th, 2018 under the supervision of Dr. Bob Coecke.

Visited the University of Edinburgh From December 1st to 14th, 2018 under the supervision of Dr. Chris Heunen.

Queen Elizabeth II Graduate (Master's) Research Scholarship, 2018. Government of Alberta
Project Title: Identifying Quantum Circuits Generated by the Toffoli Gate

Queen Elizabeth II Graduate (Master's) Scholarship, 2017. Government of Alberta

Graduate Research Award, two units, 2017–2018. University of Calgary

SERVICE

Organizer

QUACS informal seminar series — *November 2024-ongoing*
ZX-calculus seminar series — *October 2019-July 2021*

Reviewer

Program committee member

8th International Conference on Applied Category Theory (ACT 2025)

Journal reviewer

Bulletin of the London Mathematical Society
ACM Transactions on Quantum Computing
Journal of Physics A: Mathematical and Theoretical
Compositionality

Conference subreviewer

21st International Conference on Quantum Physics and Logic (QPL 2024)
39th Annual ACM/IEEE Symposium on Logic in Computer Science (LICS 2024)
20th International Conference on Quantum Physics and Logic (QPL 2023)
18th Theory of Quantum Computation, Communication and Cryptography (TQC 2023)
19th International Conference on Quantum Physics and Logic (QPL 2022)
47th International Symposium on Mathematical Foundations of Computer Science (MFCS 2022)
25th International Conference on Foundations of Software Science and Computation Structures (FOSSACS 2022)
4th International Conference on Applied Category Theory (ACT 2021)

TEACHING ACTIVITIES

Tutor — *July 2023*

Quantinuum, Oxford, United Kingdom
Teaching categorical quantum mechanics to high-school students.
Organized as part of quantum education research project.

Tutor — *Michaelmas 2020*

Department of Computer Science, University of Oxford, United Kingdom
Course: Categories Proofs and Processes

Tutor — *Michaelmas 2020*

Department of Computer Science, University of Oxford, United Kingdom
Course: Quantum Processes and Computation

Teaching Assistant — *Winter Term 2019*

Department of Computer Science, University of Calgary, Canada
Course: CPSC 313, Introduction to Computability

Teaching Assistant — *Winter Term 2018*

Department of Computer Science, University of Calgary, Canada
Course: CPSC 411, Compiler Construction

Teaching Assistant *Fall Term 2017*

Department of Computer Science, University of Calgary, Canada
Course: CPSC 521, Foundations of Functional Programming

INVITED, REFEREED AND WORKSHOP PRESENTATIONS

A complete equational theory for Gausian quantum circuits. 31st Foundational Methods in Computer Science Workshop (FMCS 2024). University of Calgary, Kanaskis, Canada. July 2024.

Graphical Symplectic Algebra and **Complete equational theories for classical and quantum Gaussian relations** (consecutive talks). 7th International Conference on Applied Category Theory (ACT 2024). University of Oxford, United Kingdom. June 2024.

Graphical Calculi for Phase-Space Representations in Quantum Mechanics. *Invited by Dr. Branislav Jurco to speak at the Prague Mathematical Physics Seminar* (online). Charles University, Czech Republic, March 2023.

Graphical algebra and quantum circuits. *Invited by the geometric methods in mathematics group of Dr. Ulrich Krähmer*. Technische Universität Dresden, Germany. December 2023.

The Algebra of Stabilizer Codes. *Best student paper*. 19th International Conference on Quantum Physics and Logic (QPL 2023). Paris, France. July 2023.

Coend Optics for Quantum Combs. 5th International Conference on Applied Category Theory (ACT 2022). University of Strathclyde, Glasgow, Scotland. July 2022.

Graphical Symplectic Algebra. 29th Foundational Methods in Computer Science Workshop (FMCS 2022). University of Calgary, Kanaskis, Canada. July 2022

A Graphical Calculus for Lagrangian Relations. *Distinguished presentation*. The 4th International Conference on Applied Category Theory (ACT 2021). University of Cambridge, United Kingdom. July 2021

A Graphical Calculus for Lagrangian Relations. Tangent Categories and their Applications (online due to COVID). University of Calgary, Kananaskis, Canada. June 2021

The ZX&-calculus: A complete graphical calculus for classical circuits using spiders. *Best student paper*. 17th International Conference on Quantum Physics and Logic (QPL 2020) (online due to COVID). Paris, France. June 2020

Circuit Relations for Real Stabilizers: Towards TOF+H. 27th Foundational Methods in Computer Science Workshop (FMCS 2019). University of Calgary, Kananaskis, Canada. May 2019

Circuit Relations for Real Stabilizers: Towards TOF+H. 4th Symposium on Compositional Structures (SYCO 2019). Chapman University, Orange, United States. May 2019

The category TOF. 15th International Conference on Quantum Physics and Logic (QPL 2018). Dalhousie University, Halifax, Canada. June 2018.

The category TOF. 26th Foundational Methods in Computer Science Workshop (FMCS 2018). Mount Allison University, Sackville, Canada. May 2018.

The Category CNOT. 14th International Conference on Quantum Physics and Logic. Radboud University, Nijmegen, Netherlands (QPL 2017). July 2017.

The Category CNOT. 25th Foundational Methods in Computer Science Workshop (FMCS 2017). University of Ottawa, Canada. June 2017.

The Category CNOT. Calgary Applied and Industrial Mathematical Sciences Conference. University of Calgary, Canada. May 2017