Cunlu Zhou

Contact Information

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Département d'informatique (D4)
Université de Sherbrooke
2500 Boul. de l'Université
Sherbrooke (Québec), Canada, J1K 2R1

Research Interests

Quantum computing, quantum algorithms, quantum learning, optimization, machine learning, computational complexity, and quantum many-body physics

Appointments

Current:

01/2026– IBM Quantum Research Chair, Université de Sherbrooke, QC
09/2025– Associate Academic Member, Mila – Quebec AI Institute, QC
11/2024– Member, Institut quantique, Université de Sherbrooke, QC
08/2024– Assistant Professor of Computer Science, Université de Sherbrooke, QC

Past:

08/2021– FRHTP Postdoctoral Fellow, Center for Quantum Information and Control,
08/2024 University of New Mexico, Albuquerque, NM
2020–2021 Postgraduate Affiliate, Vector Institute, Toronto, ON
07/2019– Postdoctoral Fellow in Computer Science, University of Toronto, ON
07/2021 Supervisor: Henry Yuen

Education

University of Notre Dame **Notre Dame, IN, USA**

Ph.D. in Mathematics May 2019

- Dissertation: *Entropy, Optimization, and Coding Theory*
- Advisors: Roxana Smarandache and Leonid Faybusovich

Capital Normal University **Beijing, China**

M.S. in Mathematics June 2012

- Thesis: *A Remark on Calc. Var. Partial Differential Equations, 329–344 (2002)*
- Advisor: Zhaoli Liu

Chongqing Normal University **Chongqing, China**

B.A. in Mathematics June 2009

Honors and Awards

2026–2031 IBM Quantum Research Chair
2021–2024 NSF FRHTP Postdoctoral Fellowship
Center for Quantum Information and Control,
University of New Mexico, Albuquerque, NM, USA
2020–2021 Postgraduate Affiliate Award
Vector Institute, Toronto, ON, Canada
2009–2012 University Scholarships
Capital Normal University, Beijing, China

Grants

2026–2031 NSERC Alliance–Mitacs Accelerate, PI (∼$2.15 million)
2026–2029 NSERC Alliance–Mitacs Accelerate, Co-PI (∼$1.5 million total)
2026–2031 NSERC Discovery Grant, PI ($192,500)
2026–2029 Mitacs Accelerate Grant, PI ($315,000)

Publications

† Equal contribution. * Corresponding author. ‡ Alphabetical author order.

Yi, C. and **Zhou, C.***, *A Symmetry-Enabled Direct Quantum Protocol for Many-Body Green's Functions*, Quantum **10**, 2245, Oct. 2026. doi:10.22331/q-2026-10-22-2245

Dai, J., Nahman-Lévesque, O., Rabusseau, G., Hu, H., and **Zhou, C.***, *Generative Learning for Quantum Measurement Design*, arXiv:2608.11396, 2026. Submitted.

Yi, C., Takahashi, J., and **Zhou, C.***, *Modular-Annihilator Parent Hamiltonians for Purified Gibbs States: Spectral Design and Controlled Approximation*, arXiv:2608.30272, 2026. Submitted.

Yi, C.†, **Zhou, C.**†, and Takahashi, J., *Quantum Phase Estimation by Compressed Sensing*, Quantum **8**, 1579, Dec. 2024. doi:10.22331/q-2024-12-27-1579

Takahashi, J., Rayudu, C., **Zhou, C.**, King, R., Thompson, K., and Parekh, O., *An SU(2)-Symmetric Semidefinite Programming Hierarchy for Quantum Max Cut*, arXiv:2307.15688, Jul. 2023. Accepted to TQC 2024; journal manuscript submitted.

Wiersema, R., **Zhou, C.**, Carrasquilla, J. F., and Kim, Y. B., *Measurement-induced entanglement phase transitions in variational quantum circuits*, SciPost Phys. **14**, 147, Jun. 2023. doi:10.21468/SciPostPhys.14.6.147

Faybusovich, L.‡ and **Zhou, C.**‡, *Long-Step Path-Following Algorithm for Quantum Information Theory: Some Numerical Aspects and Applications*, Numerical Algebra, Control & Optimization, 12(2):445-467, Jun. 2022. doi:10.3934/naco.2021017

Wiersema, R.†, **Zhou, C.**†*, de Sereville, Y., Carrasquilla, J. F., Kim, Y. B., and Yuen, H., *Exploring entanglement and optimization within the Hamiltonian Variational Ansatz*, PRX Quantum **1**, 020319, Dec. 2020. doi:10.1103/PRXQuantum.1.020319

Faybusovich, L.‡ and **Zhou, C.**‡, *Self-Concordance and Matrix Monotonicity with Applications to Quantum Entanglement Problems*, Applied Mathematics and Computation, 375:125071, Jun. 2020. doi:10.1016/j.amc.2020.125071

Faybusovich, L.‡ and **Zhou, C.**‡, *Long-Step Path-Following Algorithm for Solving Symmetric Programming Problems with Nonlinear Objective Functions*, Comput Optim Appl, 72(3):769-795, Apr. 2019. doi:10.1007/s10589-018-0054-7

Zhou, C., Mitchell, D. G. M., and Smarandache, R., *Free Pseudodistance Growth Rates for Spatially Coupled LDPC Codes over the BEC*, 2018 IEEE Information Theory Workshop (ITW), pp. 1-5, Guangzhou, 2018. doi:10.1109/ITW.2018.8613507

Presentations

Generative Learning for Quantum Measurement Design, DRDC Ottawa Research Center Seminar Series, Sep. 2026 (invited talk, online)

Generative Learning of Optimal Quantum Measurements, 2026 CAP Congress, Ottawa, ON, Jun. 2026 (invited talk)

Unlocking Quantum Computing's Power through Optimization and Learning, INTRIQ Spring Meeting, Bromont, QC, May 2026 (invited talk)

Unlocking Quantum Computing's Power through Optimization and Learning, Institut quantique (IQ) Annual Colloquium, Sherbrooke, QC, Apr. 2026 (invited talk)

Generative Learning of Optimal Quantum Measurements, Quantum Computing for Quantum Chemistry, Molecular Dynamics, and Beyond workshop, Telluride, CO, Mar. 2026 (invited talk)

AI-Driven Quantum Algorithm Design: Towards Optimal Measurement Protocols via GFlowNets, Mila-DistriQ AI x Quantum Annual Event, Sherbrooke, QC, Feb. 2026 (invited talk)

AI-Driven Quantum Algorithm Design: Towards Optimal Measurement Protocols via GFlowNets, Quantum Days 2026, Victoria, BC, Feb. 2026 (invited talk)

Ancilla-Free Quantum Protocol for Thermal Green's Functions, INTRIQ Fall Meeting, Bromont, QC, Nov. 2025 (invited talk)

Quantum Phase Estimation by Compressed Sensing, Algorithms for Quantum Advantage Workshop, Montréal, QC, Jul. 2025 (invited talk)

Advancing Quantum Algorithm Development in Québec, Quantum Forum 2025, Troy, NY, Apr. 2025 (keynote)

Quantum Phase Estimation by Compressed Sensing, 10th International Conference on Quantum Information and Quantum Control, The Fields Institute, Toronto, ON, Aug. 2024 (talk)

Algorithms, Complexity, and Quantum Many-body Physics, University of Calgary, Calgary, AB, Apr. 2024 (talk)

Algorithms, Complexity, and Quantum Many-body Physics, University of Pittsburgh, Pittsburgh, PA, Mar. 2024 (talk)

Algorithms, Complexity, and Quantum Many-body Physics, Université de Montréal, Montréal, QC, Feb. 28, 2024 (talk)

Some Recent Results on Quantum Phase Estimation and Quantum MaxCut, University of Miami, Coral Gables, FL, Feb. 2024 (talk)

Some Recent Results on Quantum Phase Estimation and Quantum MaxCut, Université de Sherbrooke, Sherbrooke, QC, Jan. 22, 2024 (talk)

An SU(2)-Symmetric Semidefinite Programming Hierarchy for Quantum MaxCut, Université de Sherbrooke, Sherbrooke, QC, Oct. 2023 (invited talk)

An SU(2)-Symmetric Semidefinite Programming Hierarchy for Quantum MaxCut, 2023 Modeling and Optimization: Theory and Applications (MOPTA), Lehigh University, Bethlehem, PA, Aug. 2023 (talk)

A Singlet Projector Based NPA Hierarchy for the Quantum MaxCut problem, Vector Institute, Toronto, ON, Jun. 2023 (invited talk)

A Singlet Projector Based NPA Hierarchy for the Quantum MaxCut problem, 2023 CMS Summer Meeting, Ottawa, ON, Jun. 2023 (invited talk)

Entanglement and Optimization within the Hamiltonian Variational Ansatz, Fermilab, Batavia, IL, Jan. 2021 (invited talk)

Entanglement and Optimization within the Hamiltonian Variational Ansatz, Dahlem Center for Complex Quantum Systems, Freie Universität Berlin, Berlin, Dec. 2020 (invited talk)

Entanglement and Optimization within the Hamiltonian Variational Ansatz, 2020 Quantum Techniques in Machine Learning (QTML), Cambridge, MA, Nov. 2020 (invited talk)

A Long-Step Path-Following Algorithm for Quantum Entropy Optimization, IQC, Waterloo, ON, Jan. 2019 (invited talk)

Long-Step Path-Following Algorithm for Nonlinear Symmetric Problems with Applications to Quantum Entropy Optimization, 2019 Joint Mathematics Meetings (JMM), Baltimore, MD, Jan. 2019 (talk)

Free Pseudodistance Growth Rates for Spatially Coupled LDPC Codes over the BEC, 2018 IEEE Information Theory Workshop (ITW), Guangzhou, Nov. 2018 (talk)

Long-Step Path-Following Algorithm for Nonlinear Symmetric Programming Problems, 23^{rd} International Symposium on Mathematical Programming (ISMP), University of Bordeaux, Bordeaux, Jul. 2018 (talk)

Extended Professional Travel

November	2023	Institute for Pure and Applied Mathematics, Los Angeles, USA
October	2023	Vector Institute, Toronto, Canada
February	2022	Kavli Institute for Theoretical Physics, Santa Barbara, USA
February	2020	Simons Institute for the Theory of Computing, Berkeley, USA
December	2019	Israel Institute for Advanced Studies, Jerusalem, Israel
Summer	2018	IBM Research Lab, Dublin, Ireland
October	2015	Mathematical Coding Theory in Multimedia Streaming, Banff International Research Station (BIRS), Banff, Canada
Summer	2015	École Polytechnique Fédérale de Lausanne, Lausanne, Switzerland

Trainees

PhD	Rabah Abdelmouheymen Khamadja (Fall 2026–)
PhD	Hamna Aslam (Fall 2026–)
PhD	Mandar Thatte (co-supervised with Dave Touchette, Fall 2026–)
MSc	Fedor Prikolab (Fall 2026–)
MSc	Elisabeth Mailhot (co-supervised with Dave Touchette, Winter 2026–)
MSc	Julien-Pierre Houle (co-supervised with Alexandre Blais, Fall 2025–)
UG	Mariel Alvarez Salas (Mitacs Globalink Research Internship, Summer 2026)
UG	Marco Antonio Martinez Martinez (Mitacs Globalink Research Internship, Summer 2026)
UG	Louis-Félix Vigneux (industry internship, co-supervised with Quandela, 2026)
UG	Ludovic Chabot Provencher (co-supervised with Dave Touchette, 2026)
UG	Elisabeth Mailhot (co-supervised with Dave Touchette, Summer 2025)
UG	Ludovic Chabot Provencher (co-supervised with Dave Touchette, Summer 2025)
UG	Mathis Beaudoin (co-supervised with Dave Touchette, Summer 2025)
UG	Louis-Félix Vigneux (co-supervised with AlgoLab, Summer 2025)

Teaching Experience

Université de Sherbrooke:

Winter	2026	Instructor, Advanced Topics in Quantum Algorithms
Summer	2025	Instructor, Quantum Algorithms

University of New Mexico:

Summer 2024 Instructor, Optimization and Quantum Foundations

University of Notre Dame:

Spring 2018 Teaching Assistant, Calculus III
Spring 2017 Instructor, Calculus B
Fall 2016 Teaching Assistant, Linear Algebra and Differential Equations
Spring 2015 Teaching Assistant, Linear Algebra and Differential Equations
Fall 2014 Teaching Assistant, Linear Algebra and Differential Equations
Spring 2014 Teaching Assistant, Calculus B
Fall 2013 Teaching Assistant, Calculus B

Service

External Service

08/2026–06/2029 Committee Member, NSERC Discovery Grants Computer Science Evaluation Group (EG 1507)
05/2026–09/2026 Program Committee Member, 2026 IEEE International Conference on Quantum Computing and Engineering
10/2025–04/2026 Planning & Scientific Committee Member, 2026 Canadian Workshop on Quantum Algorithms
08/2025–09/2026 Local Organizing Committee Member, Theory of Quantum Computation, Communication and Cryptography (TQC 2026)
2022 Program Committee Member, Southwest Quantum Information and Technology (SQuInT 2022)

Institutional & Research Community Service

05/2025– Management Committee Member, AlgoLab
01/2025– Organizer, Quantum Algorithms Research Seminar (QARS)
12/2024–06/2026 Scientific Committee Member, 2026 AlgoLab Summer School
2023 Organizer, CQuIC Seminar
2022 Organizer, SDP & Approximation Algorithms Seminar