

# Cunlu Zhou

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RESEARCH INTERESTS quantum computing, optimization, learning, complexity, and connections with physics

APPOINTMENTS HELD **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 Affiliation, 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 Title: *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 2026–2030 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 Discovery Grant (\$192,500)  
2026–2029 Mitacs Accelerate Grant (\$315,000)

PUBLICATIONS Yi, C. and **Zhou, C.**, *A Symmetry-Enabled Direct Quantum Protocol for Many-Body Green's Functions*, arXiv:2509.03288, Sep. 2025. 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. 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

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

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

*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, Ontario, Aug. 2024 (talk)

*Algorithms, Complexity, and Quantum Many-body Physics*, University of Calgary, Calgary, Alberta, Apr. 18, 2024 (talk)

*Algorithms, Complexity, and Quantum Many-body Physics*, University of Pittsburgh, Pittsburgh, PA, Mar. 4, 2024 (talk)

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

*Some recent results on Quantum Phase Estimation and Quantum MaxCut*, University of Miami, Coral Gables, FL, Feb. 9, 2024 (talk)

*Some recent results on Quantum Phase Estimation and Quantum MaxCut*, Université de Sherbrooke, Sherbrooke, Québec, Jan. 22, 2024 (talk)

*Quantum Phase Estimation by Compressed Sensing*, Quantum Days 2024, Calgary, AB, Feb. 2024 (poster)

*An  $SU(2)$ -Symmetric Semidefinite Programming Hierarchy for Quantum MaxCut*, IPAM UCLA, Los Angeles, CA, Nov. 2023 (poster)

*Quantum Phase Estimation by Compressed Sensing*, SQUINT2023, Albuquerque, NM, Oct. 2023 (poster)

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

*Quantum Phase Estimation by Compressed Sensing*, INTRIQ Meeting, Bromont, Quebec, Oct. 2023 (poster)

*Quantum Phase Estimation by Compressed Sensing*, APQC Workshop, Estes Park, Colorado, Oct. 2023 (poster)

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

*A singlet projector based NPA hierarchy for the Quantum MaxCut problem*, Vector Institute, Toronto, Jun. 2023 (invited talk)

*A singlet projector based NPA hierarchy for the Quantum MaxCut problem*, 2023 CMS Summer Meeting, Ottawa, 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, Massachusetts, Nov. 2020 (invited talk)

*A Long-Step Path-Following Algorithm for Quantum Entropy Optimization*, IQC, Waterloo, 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, Maryland, 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<sup>rd</sup> 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

PD Elham Torabian (co-supervised with Roman Krems, Summer 2026 –)  
UG Louis-Félix Vigneux (industry internship, co-supervised with Quandela, 2026)  
UG Ludovic Chabot Provencher (co-supervised with Dave Touchette, 2026)  
MSc Elisabeth Mailhot (co-supervised with Dave Touchette, Winter 2026 –)  
PhD Alexandre Leblanc (co-supervised with Stefanos Kourtis, Fall 2025 –)  
MSc Julien-Pierre Houle (co-supervised with Alexandre Blais, Fall 2025 –)  
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

### Université de Sherbrooke

05/2026– Program Committee member, 2026 IEEE International Conference on Quantum Computing & Engineering  
 10/2025– Planning & Scientific Committee, 2026 Canadian Workshop on Quantum Algorithms  
 04/2026  
 08/2025– Local Organizing Committee, Theory of Quantum Computation, Communication and Cryptography (TQC 2026)  
 09/2026  
 05/2025– Management Committee, AlgoLab

01/2025– Organizer, Quantum Algorithms Research Seminar (QARS)

12/2024– Scientific Committee, 2026 AlgoLab Summer School  
 06/2026

### University of New Mexico

2023 Organizer, CQuIC Seminar  
 2022 Organizer, SDP & Approximation Algorithms Seminar  
 2022 Program Committee, Southwest Quantum Information and Technology (SQuInT 2022)

## REFERENCES

### **Roxana Smarandache (Ph.D. advisor), Professor**

Department of Mathematics and Electrical Engineering,  
 University of Notre Dame, Notre Dame, IN, USA  
 rsmarand@nd.edu

### **Leonid Faybusovich (Ph.D. advisor), Professor**

Department of Mathematics, University of Notre Dame, Notre Dame, IN, USA  
 lfaybuso@nd.edu

### **Henry Yuen (Postdoc supervisor), Professor**

Department of Computer Science, Columbia University, New York City, NY, USA  
 hyuen@cs.columbia.edu

### **Juan Felipe Carrasquilla, Professor**

Institute for Theoretical Physics, ETH Zürich, 8093 Zürich, Switzerland  
 jcarrasquill@ethz.ch

### **Ojas Parekh, Principal Member of Technical Staff**

Sandia National Labs, Albuquerque, NM, USA  
 odparek@sandia.gov