

Cunlu Zhou

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RESEARCH INTERESTS	quantum computing, optimization, machine learning, complexity theory, and connections with physics	
APPOINTMENTS HELD	11/2024– Member, Institut quantique, Université de Sherbrooke, QC 08/2024– Assistant professor of computer science, Université de Sherbrooke, QC 08/2021– FRHTP Postdoctoral Fellow, Center for Quantum Information and Control, University of New Mexico, Albuquerque, NM 2020–2022 Postgraduate Affiliation, Vector Institute, 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: <i>Entropy, Optimization, and Coding Theory</i> • Advisors: Roxana Smarandache and Leonid Faybusovich Capital Normal University Beijing, China M.S. in Mathematics June 2012 • Thesis: <i>A Remark on Calc. Var. Partial Differential Equations, 329-344 (2002)</i> • Advisor: Zhaoli Liu Chongqing Normal University Chongqing, China B.A. in Mathematics June 2009	
HONORS AND AWARDS	2025–2030 IBM Quantum Research Chair (\$575,000 CAD over 5 years) 2021–2023 NSF FRHTP Postdoctoral Fellowship (~\$70,000 USD per year) Center for Quantum Information and Control, University of New Mexico, Albuquerque, NM, USA 2020–2021 Postgraduate Affiliate Award (\$12,000 CAD) Vector Institute, Toronto, ON, Canada 2009–2012 University Scholarships Capital Normal University, Beijing, China	
PUBLICATIONS	Yi, C., Zhou, C. , and Takahashi, J., <i>Quantum Phase Estimation by Compressed Sensing</i> , Quantum 8 , 1579, 2024. doi:10.22331/q-2024-12-27-1579 Takahashi, J., Rayudu, C., Zhou, C. , King, R., Thompson, K., and Parekh, O., <i>An $SU(2)$-symmetric Semidefinite Programming Hierarchy for Quantum Max Cut</i> , arXiv:2307.15688, Jul. 2023. Accepted to TQC 2024. Submitted. Wiersema, R., Zhou, C. , Carrasquilla, J. F., and Kim, Y. B., <i>Measurement-induced entanglement phase transitions in variational quantum circuits</i> , 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

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, 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, 23rd 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

ADVISEES	PhD Alexandre Leblanc (co-advised with Stefanos Kourtis. Fall 2025 –) MSc Julien-Pierre Houle (co-advised with Alexandre Blais. Fall 2025 –) UG Elisabeth Mailhot(co-advised with Dave Touchette. Summer 2025) UG Ludovic Chabot Provencher (co-advised with Dave Touchette. Summer 2025) UG Mathis Beaudoin (co-advised with Dave Touchette. Summer 2025) UG Louis-Félix Vigneux (Summer 2025)
TEACHING EXPERIENCE	Université de Sherbrooke: Summer 2025 Instructor, Topics in 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 2025– Organizer, Quantum Algorithms Research Seminar (QARS) University of New Mexico 2023 Organizer, CQuIC Seminar 2022 Organizer, SDP & Approximation Algorithms Seminar Program committees 2022 Southwest Quantum Information and Technology (SQuInT)
RELEVANT SKILLS	Languages: Fluent in English and Chinese Computer Skills: Proficient in Python and MATLAB
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

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Ojas Parekh, Principal Member of Technical Staff

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