

David J. Rosenbaum

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Curriculum Vitæ

Education

- 6/15 **PhD**, University of Washington, Computer Science & Engineering.
Thesis: Quantum computation and isomorphism testing
Advisors: Paul Beame and Aram Harrow
- 1/13–6/15 **Visiting Graduate Student**, Massachusetts Institute of Technology, Center for Theoretical Physics.
- 6/12 **MS**, University of Washington, Computer Science & Engineering.
- 6/10 **BS**, *Summa Cum Laude*, Portland State University, Computer Science.
- 6/10 **BS**, *Summa Cum Laude*, Portland State University, Mathematics.

Academic employment

- 7/15–7/16 **Postdoctoral Fellow**, University of Tokyo, Department of Computer Science.
Advisor: François Le Gall

Awards

- 7/15–7/16 Japan Society for the Promotion of Science Postdoctoral Fellowship
- 4/14 Simons Award for Graduate Students in Theoretical Computer Science
- 4/11 National Defense Science and Engineering Graduate Fellowship
- 4/11 National Science Foundation Graduate Research Fellowship (declined)
- 6/10 Maseeh College of Engineering and Computer Science Commendation Award
- 5/09 Portland State University Department of Mathematics and Statistics Robert W. Rempfer Endowed Scholarship
- 5/08 Young Researcher Award at the 38th International Symposium on Multiple Valued Logic
- 4/06 Portland State University Maseeh College Dean's Scholarship

Research interests

Algorithms (both quantum and classical)

Isomorphism problems
Algebraic and group-theoretic problems
Quantum circuits
Quantum state preparation

Journal papers

- [1] David J. Rosenbaum and Fabian Wagner. Beating the generator-enumeration bound for p -group isomorphism. *Theoretical Computer Science*, 593:16–25, 2015, arXiv:1312.1755.
- [2] Aram W. Harrow and David J. Rosenbaum. Uselessness for an oracle model with internal randomness. *Quantum Information and Computation*, 14(7&8), May 2014, arXiv:1111.1462.
- [3] David J. Rosenbaum. Binary superposed quantum decision diagrams. *Quantum Information Processing*, 9:463–496, August 2010.
- [4] David J. Rosenbaum and Marek A. Perkowski. Extended superposed quantum state initialization using disjoint prime implicants. *Physical Review A*, 79(5):052310, May 2009.

Conference papers

- [5] David J. Rosenbaum. Optimal quantum circuits for nearest-neighbor architectures. In *Eighth Conference on the Theory of Quantum Computation, Communication and Cryptography*, volume 22, pages 294–307, May 2013, arXiv:1205.0036.
- [6] David J. Rosenbaum. Breaking the $n^{\log n}$ barrier for solvable-group isomorphism. In *Proceedings of the Twenty-Fourth Annual ACM-SIAM Symposium on Discrete Algorithms*, pages 1054–1073, January 2013, arXiv:1205.0642.
- [7] David J. Rosenbaum and Marek A. Perkowski. Mapping binary functions to a practical adiabatic quantum computer. In *Proceedings of the 40th International Symposium on Multiple Valued Logic*, pages 270–275, May 2010.
- [8] David J. Rosenbaum and Marek A. Perkowski. Efficient implementation of controlled operations for multivalued quantum logic. In *Proceedings of the 39th International Symposium on Multiple Valued Logic*, pages 86–91, May 2009.
- [9] David J. Rosenbaum and Marek A. Perkowski. Superposed quantum state initialization using disjoint prime implicants. In *Proceedings of the 38th International Symposium on Multiple Valued Logic*, pages 144–149, May 2008.

Preprints

- [10] Aram W. Harrow and David J. Rosenbaum. Permutations in 2D quantum circuits. 2016. In preparation.
- [11] François Le Gall and David J. Rosenbaum. On the group and color isomorphism problems. 2016, arXiv:1609.08253.
- [12] David J. Rosenbaum. Beating the generator-enumeration bound for solvable-group isomorphism. December 2014, arXiv:1412.0639. Submitted to ACM Transactions on Computation Theory.

- [13] David J. Rosenbaum. Bidirectional collision detection and faster deterministic isomorphism testing. April 2013, arXiv:1304.3935. Submitted to Theoretical Computer Science.
- [14] David J. Rosenbaum. Quantum algorithms for tree isomorphism and state symmetrization. August 2010, arXiv:1011.4138.

Invited and conference talks

- 6/14 Bidirectional Collision Detection and Faster Algorithms for Group Isomorphism, GCG 2014
- 5/13 Optimal Quantum Circuits for Nearest-Neighbor Architectures, TQC 2013
- 3/13 Bidirectional Collision Detection and Faster Deterministic Isomorphism Testing, Massachusetts Institute of Technology, PUMAGRASS.
- 1/13 Breaking the $n^{\log n}$ Barrier for Solvable-Group Isomorphism, SODA 2013
- 12/12 Breaking the $n^{\log n}$ Barrier for Solvable-Group Isomorphism, University of Washington, Combinatorics Seminar.
- 8/12 Breaking the $n^{\log n}$ Barrier for Solvable-Group Isomorphism, University of Waterloo, IQC.
- 5/08 Mapping Binary Functions to a Practical Adiabatic Quantum Computer, ISMVL 2010.
- 5/08 Superposed Quantum State Initialization Using Disjoint Prime Implicants (SQUID), ISMVL 2008.

Professional activities

Reviewing

- Quantum Information Processing (QIP)
- Computational Complexity Conference (CCC)
- International Symposium on Algorithms and Computation (ISAAC)
- Scandinavian Symposium and Workshops on Algorithm Theory (SWAT)
- Theory of Computing (ToC)
- SIAM Journal on Computing (SICOMP)
- IEEE Transactions on Computers (TC)
- Quantum Information & Computation (QIC)
- Journal of Quantum Information Processing (QINP)