

EDUCATION

- 2013 – 2019 **Massachusetts Institute of Technology** Cambridge, MA.
PhD in Computer Science
Masters Thesis: *A Classification of Reversible Bit and Stabilizer Operations*
PhD Thesis: *Three Complexity Classification Questions at the Quantum/Classical Boundary*
Advisor: Scott Aaronson
- 2009 – 2013 **University of South Carolina** Columbia, SC.
B.S. in Computer Science and Mathematics, GPA: 4.0
Honors Thesis: *On the Theory of Poset Games*
Advisor: Stephen Fenner

POSTDOCTORAL FELLOWSHIP

- 2019 – present **University of Waterloo – Institute for Quantum Computing** Waterloo, ON, Canada.

PUBLICATIONS

- o D. Padé, S. Fenner, D. Grier, and T. Thierauf. Depth-2 QAC circuits cannot simulate quantum parity. *arXiv 2005.12169*, 2020.
- o D. Grier, and L. Schaeffer. Interactive shallow Clifford circuits: quantum advantage against NC^1 and beyond. *To appear in 52nd Annual ACM Symposium on Theory of Computing*, 942–965, 2020.
- o S. Aaronson, D. Grier, and L. Schaeffer. A Quantum Query Complexity Trichotomy for Regular Languages. *IEEE 60th Annual Symposium on Foundations of Computer Science*, 942–965, 2019.
- o D. Grier, and L. Schaeffer. New Hardness Results for the Permanent Using Linear Optics. *Computational Complexity Conference*, 2018.
- o D. Grier, and L. Schaeffer. The Classification of Stabilizer Operations over Qubits. *Conference on Quantum Information Processing*, 2018.
- o S. Aaronson, D. Grier, and L. Schaeffer. The Classification of Reversible Bit Operations. *8th Innovations in Theoretical Computer Science Conference*, 2017.
- o I. Arad, A. Bouland, D. Grier, M. Santha, A. Sundaram, and S. Zhang. On the Complexity of Probabilistic Trials for Hidden Satisfiability Problems. *Mathematical Foundations of Computer Science*, 12:1–12:14, 2016.
- o S. Fenner, D. Grier, J. Messner, L. Schaeffer, and T. Thierauf. Game Values and Computational Complexity: An Analysis via Black-White Combinatorial Games. *Algorithms and Computation*. Springer Berlin Heidelberg, 689–699, 2015.
- o D. Grier. Deciding the Winner of an Arbitrary Finite Poset Game is PSPACE-complete. *Automata, Languages, and Programming*, Springer Berlin Heidelberg, 497–503, 2013.

- o D. Grier. On the Cyclic Van der Waerden Numbers. *Geombinatorics*, 21:129–131, 2012.

RESEARCH

2013 – 2019 **Graduate Research Assistant** MIT.

- o Studied quantum computation in restricted settings, especially when only non-universal gate sets are available.
- o Investigated connections between classical computer science and quantum mechanics, such as quantum proofs of classical theorems.

Summer 2018 **IQC Visiting Student** Waterloo, Ontario.

- o Worked with John Watrous on statistical zero knowledge and the robustness of complete problems for the complexity class SZK.

January 2018 **IBM Research Intern** Cambridge, MA.

- o Worked with Ramis Movassagh on the role of entanglement in quantum many-body systems through classical simulation of quantum circuits using matrix product states.

PRESENTATIONS

January 2020 **Interactive shallow Clifford circuits**
Conference on Quantum Information Processing

January 2019 **A Quantum Query Complexity Trichotomy for Regular Languages**
Conference on Quantum Information Processing

June 2018 **New Hardness Results for the Permanent Using Linear Optics**
Computation Complexity Conference

December 2017 **The Classification of Reversible Bit Operations**
Innovations in Theoretical Computer Science

December 2015 **Game Values and Computational Complexity**
International Symposium on Algorithms and Computation

July 2013 **Deciding the Winner of an Arbitrary Finite Poset Game is PSPACE-Complete**
International Colloquium on Automata, Languages and Programming

TEACHING

2017 – 2019 **Communications Lab Advisor** MIT.

- o Coach peers to improve their manuscripts, posters, presentations, etc.
- o Developed workshop for students preparing for oral qualifying exam.

Fall 2017, 2018 **Design and Analysis of Algorithms** Teaching Assistant, MIT.

- o Developed course materials such as problem sets, exams, and recitation topics.
- o Taught weekly recitation.

Spring 2018 **Automata, Computability, and Complexity** Teaching Assistant, MIT.

AWARDS

April 2013 NSF Graduate Research Fellow
April 2013 CRA Outstanding Undergraduate Researcher Award - Finalist
April 2013 Outstanding Undergraduate Student in Mathematics
April 2013 Outstanding Senior in Computer Science
March 2012 Barry M. Goldwater Scholarship