Hrishee M. Shastri

Website: sites.google.com/view/hrishee

EDUCATION

Reed College, Portland, Oregon, USA 2017–2021

- B.A., Computer Science & Mathematics (GPA: 3.90, Major GPA: 3.93)
- **Senior Thesis**, advised by Professors Jim Fix and Marcus Robinson
  Topic: Self-adjusting skip graphs with working set properties

RESEARCH EXPERIENCE

Joint Center for Quantum Information and Computer Science, University of Maryland 2020

Advised by Professors Andrew Childs and Alexey Gorshkov

- Investigated the problem of routing qubits along a path graph using parallel reversals.
- Designed an algorithm that grants a provable asymptotic constant factor speedup in the worst case routing time over the optimal SWAP-based algorithm, the first known quantum advantage over SWAP-based routing.
- Proved that the optimal swap based algorithm has average routing time asymptotically equal to its worst case routing time, which our algorithm outperforms in the average case.
- Submitted a conference paper to QIP 2021. We are also currently preparing a journal paper for peer review, to be submitted to Quantum.

Department of Computer Science, Reed College 2019 – 2020

Advised by Professor Eitan Frachtenberg

- Analyzed locality properties of binary-integer problem representations on Evolutionary Algorithm performance.
- Proved tight lower and upper bounds on local and global locality metrics and proved that standard binary and binary reflected gray representations exhibit optimal locality.
- Designed algorithms for generating gray codes with sub-optimal locality.
- Proved asymptotic equivalence among all representations for global locality.
- Implemented multiple Evolutionary Algorithm experiments to obtain empirical evidence for performance as a function of representation locality.
- Conference paper accepted at IEEE FOCI 2020, to appear December 2020. We have also submitted an expanded journal version to PeerJ Computer Science. ArXiv version

PUBLICATIONS

[1] Hrishee Shastri and Eitan Frachtenberg. "Locality Bounds for Nonredundant Binary-Integer Representations," in 2020 IEEE Symposium on Foundations of Computational Intelligence (FOCI)

WORKING PAPERS

[2] "Revisiting Locality in Binary-Integer Representations," with Eitan Frachtenberg. Submitted to *PeerJ Computer Science*.

[3] "Quantum Routing with Fast Reversals," with Sam King, Aniruddha Bapat, Eddie Schoute, Andrew Childs, and Alexey Gorshkov. Submitted to *QIP '21*. Journal version to be submitted to *Quantum*.

TEACHING EXPERIENCE

Computer Science Teaching Assistant, Reed College Dept. of Computer Science 2018 – 2020

- Held weekly office hours and labs for introductory level computer science classes
- Graded assignments, projects, and exams

Mathematics Teaching Assistant, Reed College Dept. of Mathematics 2019

- Held weekly office hours for Calculus, Analysis, Discrete Math, Linear Algebra, Vector Calculus

SKILLS

Technical Languages Python, Javascript, C++, Mathematica, MIPS Assembly, LaTeX, HTML, CSS

Human Languages English (*native*), Tamil (*conversational*)

AWARDS

Commendation of Academic Excellence, Reed College 2018, 2019, 2020

Reed College Undergraduate Research Opportunity Grant 2020