Quantum Science & Engineering Center

Quantum Computing Seminar Series

GEORGE MASON UNIVERSITY

John Kallaugher

Sandia National Laboratories

A Quantum Advantage for a Natural Streaming Problem

Monday, March 21, 2022 | 12–1pm | Zoom

Abstract

Data streaming, in which a large dataset is received as a "stream" of updates, is an important model in the study of space-bounded computation. Starting with the work of Le Gall [SPAA '06], it has been known that quantum streaming algorithms can use asymptotically less space than their classical counterparts for certain problems. However, so far, all known examples of quantum advantages in streaming are for problems that are either specially constructed for that purpose or require many streaming passes over the input.

We give a one-pass quantum streaming algorithm for one of the best-studied problems in classical graph streaming—the triangle counting problem. Almost-tight parametrized upper and lower bounds are known for this problem in the classical setting; our algorithm uses polynomially less space in certain regions of the parameter space, resolving a question posed by Jain and Nayak in 2014 on achieving quantum advantages for natural streaming problems.

Meeting Information

https://gmu.zoom.us/j/93426209769?pwd=TjNmaWpvMlYxRzZGUkNzeHdPV2g3QT09

About the Seminar Series

The Quantum Computing Seminar Series are a series of working seminars organized and hosted by QSEC's quantum computing subgroup on Mondays. These events are free and open to the public. More information is available on QSEC's Computing Events and Mathematical Sciences Department's Quantum Computing Seminars. For any questions, contact qsec@gmu.edu.