Gregory D. Kahanamoku-Meyer

Formerly: Gregory D. Meyer
Quantum computing, high performance computing, cryptography

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EDUCATION

University of California at Berkeley — *PhD [exp. Summer '23]*

AUGUST 2017 - PRESENT

Lab of Dr. Norman Yao, Department of Physics. **M.A. awarded 2019.** Co-advised by Dr. Umesh Vazirani

Yale University, New Haven, CT — *BS Physics (intensive track)*

AUGUST 2012 - MAY 2016

Distinction in the major; cum laude; Howard L Schultz award.

SELECTED RESEARCH PROJECTS
(see full list of publications on my website)

Classically verifiable quantum advantage

Created the currently most practical "cryptographic proof of quantum advantage." Published quantum circuits for the protocol using Cirq. Theory lead for the first experimental implementation of the protocol. Invited talk at March Meeting 2022.

GDKM, S. Choi, U. Vazirani, N. Yao. *Classically-verifiable quantum advantage from a computational Bell test.* arXiv:2104.00687 (published in Nature Physics)

GDKM, D. Zhu, et al. *Interactive Protocols for Classically-Verifiable Quantum Advantage.* arXiv:2112.05156 (in review for Nature Physics)

dynamite: massively parallel numerical quantum dynamics

Primary author and maintainer of library for extremely fast time evolution and eigensolving for numerical quantum many-body spin chain physics. Parallelized using MPI and CUDA. Used for record-breaking computations (e.g. SYK model with 60 majoranas); >800K pulls on Docker Hub. dynamite.readthedocs.io

Forging quantum data: classically defeating a quantum test

I demonstrate how to classically break a cryptographic "proof of quantumness" (unbroken since 2008). Implemented in Julia.

GDKM. *Forging quantum data: classically defeating an IQP-based quantum test.* arXiv:1912.05547

PROGRAMMING

Languages: Python, Julia, C, C++, …

Parallelism: MPI, OpenMP, CUDA

Tools: Cython, CUDA.jl, iTensor, Cirq, NumPy/SciPy, Docker, SLURM, …

GitHub: github.com/GregDMeyer

Side project: E-paper display driver for Raspberry Pi with hundreds of downloads weekly

GRAD. FELLOWSHIPS

National Defense Science + Engineering Graduate Fellowship (NDSEG) *Dept. of Defense* $115,200 + tuition, fees, etc.

Graduate Research Fellowship Program (GRFP) *National Science Foundation* [declined for NDSEG] $102,000 + institutional grant

Heising-Simons Fellowship in Physics *UC Berkeley* $67,000

TALKS
(see full list and details on my website)

Invited conference talk: APS March Meeting 2022, *Focus session: Quantum digital and analog algs.*

Research seminars: Harvard Physics, MIT Physics, MIT Cryptography and Security, IBM Quantum, Simons Institute, UT Austin Quantum Info., IT Lisbon Physics