Jeffrey M Epstein

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Work Experience

Atom Computing, Senior Applications Engineer Aug 2021 - present

- Decoder implementation and development of tools for logical circuit compilation and logical error rate analysis, suitable for comparing error correction schemes in preparation for small-scale experimental demonstrations
- Development of circuit simulation and statistical analysis tools for efficient gate characterization
- Led characterization/benchmarking component of DARPA US2QC program
- Development of novel state preparation algorithm for constrained optimization
- Built tools based on Q-CTRL software for optimization of pulse sequences on atomic platform, facilitating design of rapid gates robust against various sources of noise.
- Supervised company's first theory intern, leading to her authorship on a scientific publication.

National Institute of Standards and Technology, Postdoctoral Scholar Feb 2021 - June 2021

- Research on quantum information and thermodynamics, leading to publication.
- NIST NRC Postdoctoral Research Associateship, 2021

University of California, Berkeley, Graduate Student Researcher June 2015 - Dec 2020

- Research and publication on problems in quantum information theory and nonequilibrium statistical mechanics.
- National Defense Science and Engineering Graduate (NDSEG) Fellowship, 2016 - 2021

University of California, Berkeley, Graduate Student Instructor Sep 2014 - May 2015

- Physics 112 (intro. to statistical and thermal physics), Physics 7b (intro. thermodynamics and electromagnetism for scientists and engineers). Taught sections, held regular office hours, and graded problem sets and exams.

IBM Research, TJ Watson Research, Quantum Computing Intern Sep 2012 - June 2013

- Studied robustness of randomized benchmarking (RB) under varying noise models, leading to a highly-cited publication used in the field as evidence for the validity of RB for benchmarking quantum processors subject to realistic physical noise.

Education

2014-2020 University of California, Berkeley, PhD in physics
Dissertation: Statistical Mechanics of Transport Processes in Active Matter

2013-2014 Perimeter Institute for Theoretical Physics, MSc in Theoretical Physics (PSI)

2008-2012 Harvard College, AB magna cum laude with high honors in field
Concentration in Chemistry and Physics
Secondary field in Mathematics
Language citation in Chinese

Publications

1. Repeated ancilla reuse for logical computation on a neutral atom quantum computer JA Muniz, D Crow, H Kim, JM Kindem, WB Cairncross, A Ryou, ... arXiv preprint arXiv:2506.09936 3 2025
2. High-Fidelity Universal Gates in the Ground-State Nuclear-Spin Qubit JA Muniz, M Stone, DT Stack, M Jaffe, JM Kindem, L Wadleigh, ... PRX Quantum 6 (2), 020334 30 2025
3. Reasoning across spacelike surfaces in the Frauchiger-Renner thought experiment **JM Epstein** arXiv preprint

arXiv:2503.00966 2025

4. Thermally driven quantum refrigerator autonomously resets superconducting qubit. M Aamir, P Suria, J Guzmán, C Castillo-Moreno, **JME**, N Yunger Halpern, S Gasparinetti. Nature Physics 21 (2), 318-323 54 2025
5. Fault-tolerant quantum computation with a neutral atom processor BW Reichardt, A Paetznick, D Aasen, I Basov, JM Bello-Rivas, ... arXiv preprint arXiv:2411.11822 6 2024
6. Logical computation demonstrated with a neutral atom quantum processor BW Reichardt, A Paetznick, D Aasen, I Basov, JM Bello-Rivas, ... arXiv e-prints, arXiv: 2411.11822
7. Note on simple and consistent gateset characterization including calibration and decoherence errors. **JME**. arXiv:2402.17727 (2024)
8. Subspace Correction for Constraints. K Pawlak, **JME**, D Crow, S Gandhari, M Li, T Bohdanowicz, J King. arXiv:2310.20191 (2024)
9. Iterative assembly of 171Yb atom arrays in cavity-enhanced optical lattices. M Norcia et al. arXiv:2401.16177 (2024)
10. Mid-circuit qubit measurement and rearrangement in a 171Yb atomic array. M Norcia et al. arXiv:2305.19119 (2023)
11. Odd Diffusivity of Chiral Random Motion. C Hargus, **JME**, KK Mandadapu. Phys. Rev. Lett. 127, 178001 (2021).
12. Quantum noise limits for a class of nonlinear amplifiers. **JME**, KB Whaley, J Combes. Phys. Rev. A 103 (5), 052415 (2021).
13. Continuous quantum error correction for evolution under time-dependent Hamiltonians. J Atalaya, S Zhang, MY Niu, A Babakhani, HCH Chan, **JME**, KB Whaley. Phys. Rev. A 103, 042406 2021
14. Time reversal symmetry breaking and odd viscosity in active fluids: Green-Kubo and NEMD results. C Hargus, K Klymko, **JME**, KK Mandadapu. J. Chem. Phys. 152, 201102 (2020).
15. Time reversal symmetry breaking in two-dimensional non-equilibrium viscous fluids. **JME**, KK Mandadapu. Phys. Rev. E 101, 052614 (2020).
16. Statistical Mechanics of Transport Processes in Active Fluids II: Equations of Hydrodynamics for Active Brownian Particles. **JME**, K Klymko, KK Mandadapu. J. Chem. Phys. 150, 164111 (2019).
17. Postponing the orthogonality catastrophe: efficient state preparation for electronic structure simulations on quantum devices. NM Tubman, C Mejuto-Zaera, **JME**, D Hait, DS Levine, W Huggins, Z Jiang, JR McClean, R Babbush, M HeadGordon, KB Whaley. arXiv:1809.05523 (2018).
18. Quantum Speed Limits for Quantum Information Processing Tasks. **JME**, KB Whaley. Phys. Rev. A 95, 042314 (2017).
19. Investigating the Limits of Randomized Benchmarking Protocols. **JME**, AW Cross, E Magesan, and JM Gambetta. Phys. Rev. A 89, 062321 (2014)
20. CD36 in the periphery and brain synergize in stroke injury in hyperlipidemia. E Kim, M Febbraio, Y Bao, AT Tolhurst, **JME**, S Cho. Annals of Neurology. 71(6) (2012)