Jeffrey M. Epstein

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June 19, 2020

## Education

**PhD**, Physics, December 2020 (expected)
Dissertation: *Statistical Mechanics of Transport Processes in Active Matter*
**MA**, Physics, December 2016
**University of California, Berkeley**; Berkeley, CA

**MSc**, Perimeter Scholars International (PSI), June 2014
**Perimeter Institute for Theoretical Physics**; Waterloo, ON

**AB**, Chemistry and Physics, May 2012
**Harvard College**; Cambridge, MA
*magna cum laude* with high honors in field
secondary field, Mathematics; language citation, Chinese

## Awards

- National Defense Science and Engineering Graduate (NDSEG) Fellowship, awarded 2016
- Herchel Smith-Harvard Undergraduate Science Research Program, awarded 2010

## Research

At UC Berkeley, I have worked as a graduate student researcher (GSR) with Professors Kranthi Mandadapu and Birgitta Whaley. With Professor Mandadapu I study nonequilibrium thermodynamics and statistical mechanics, focusing on the emerging field of active matter. In particular, I have shown how active forces appear in the continuum equations of motion of a system of Active Brownian Particles, and I have derived Green-Kubo equations for generic two-dimensional non-equilibrium fluids, including an expression for the odd viscosity.

With Professor Whaley I have established speed limits on quantum information processing tasks, derived from an extension of the Lieb-Robinson bound to time-dependent local Hamiltonians. More recently, I have demonstrated a connection between a class of nonlinear quantum amplifiers and the von Neumann model of measurement.

From August 2012-July 2013 I worked in the Quantum Information Group at IBM T.J. Watson research center as a research intern. My work focused on testing numerically the performance of randomized benchmarking, a method for assessing fidelities of quantum gates.

## Scientific Publications

1. **JME**, KB Whaley, J Combes. *Quantum noise limits for a class of nonlinear amplifiers.* Manuscript in preparation (2020).
2. C Hargus, K Klymko, **JME**, KK Mandadapu. *Time reversal symmetry breaking and odd viscosity in active fluids: Green-Kubo and NEMD results.* J. Chem. Phys. 152, 201102 (2020).
3. **JME**, KK Mandadapu. *Time reversal symmetry breaking in two-dimensional non-equilibrium viscous fluids.* Phys. Rev. E 101, 052614 (2020).
4. J Atalaya, S Zhang, MY Niu, A Babakhani, HCH Chan, **JME**, KB Whaley. *Continuous quantum error correction for evolution under time-dependent Hamiltonians.* arXiv:2003.11248 (2020).
5. **JME**, K Klymko, KK Mandadapu. *Statistical Mechanics of Transport Processes in Active Fluids II: Equations of Hydrodynamics for Active Brownian Particles.* J. Chem. Phys. 150, 164111 (2019).
6. NM Tubman, C Mejuto-Zaera, **JME**, D Hait, DS Levine, W Huggins, Z Jiang, JR McClean, R Babbush, M Head-Gordon, KB Whaley. *Postponing the orthogonality catastrophe: efficient state preparation for electronic structure simulations on quantum devices.* arXiv:1809.05523 (2018).

7. **JME**, KB Whaley. *Quantum Speed Limits for Quantum Information Processing Tasks.* Phys. Rev. A 95, 042314 (2017).
8. **JME**, AW Cross, E Magesan, and JM Gambetta. *Investigating the Limits of Randomized Benchmarking Protocols.* Phys. Rev. A 89, 062321 (2014)
9. E Kim, M Febbraio, Y Bao, AT Tolhurst, **JME**, S Cho. *CD36 in the periphery and brain synergize in stroke injury in hyperlipidemia.* Annals of Neurology. 71(6) (2012)

## Teaching

- Graduate Student Instructor for Physics 112 (Introduction to statistical and shermal physics) UC Berkeley, Fall 2015
- Graduate Student Instructor for Physics 7b (Introductory thermodynamics and electromagnetism for scientists and engineers) Fall 2014, UC Berkeley, Spring 2015

## Conferences and Seminars

1. *Quantum Foundations Seminar.* Informal seminar organized and taught at Berkeley (2020).
2. *Active matter, time reversal symmetry breaking, and Onsager reciprocal relations.* Poster presented at Berkeley Statistical Mechanics Meeting (2020).
3. *Rheology of 2D Active Fluids.* Berkeley Soft Matter Seminar (2019).
4. *Quantum noise limits for a class of nonlinear amplifiers.* Talk presented at APS March Meeting (2019).
5. *Transport Processes in Active Fluids.* Talk presented at APS March Meeting (2019).
6. *Continuum Mechanics of Active Brownian Particles.* Poster presented at Gordon Research Conference and Seminar: Complex Active and Adaptive Material Systems (2019).
7. *Speed Limits for Quantum Control of Local Spin Systems.* Talk presented at APS March Meeting (2018).
8. *Speed Limits for Quantum Control of Local Spin Systems.* Talk presented at SQuInT (2017).
9. Lectures on Statistical Field Theories. Workshop attended at Galileo Galilei Institute for Theoretical Physics, (2017).
10. *Combinatorial Results on the Stabilizer Polytope.* Poster presented at SQuInT (2015).