

Sacha Greenfield

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EDUCATION

Bachelor of Arts in Physics, Carleton College, Northfield, MN June 2019
Magna cum laude, GPA 3.93/4.00

RESEARCH EXPERIENCE

Graduate researcher, USC, Los Angeles, CA Dec. 2020 – Present

- Work under the guidance of Prof. Eli Levenson-Falk and Prof. Justin Dressel.
- Train in experimental methods in superconducting quantum computation.
- Investigate weak measurement feedback protocols for superconducting qubit control.
- Develop simulation library in Julia, QuantumCircuits.jl, to efficiently simulate quantum trajectories in superconducting quantum circuits.

Research Scholar, Chapman University, Orange, CA June 2019 – Aug. 2020,

- Worked under the guidance of Prof. Justin Dressel. Aug. 2018 – Sep. 2018
- Developed ontological models of non-interacting measurements.
- Simulated dynamics of weakly measured superconducting qubits.

Research Assistant, Carleton College, Northfield, MN Jan. 2016 – June 2018

- Worked under the guidance of Prof. Arjendu Pattanayak.
- Simulated the Duffing oscillator by solving coupled partial differential equations in xmds2.
- Developed quantum control techniques through mathematical analysis and numerical simulation.
- Trained sophomore and freshman students in research techniques and concepts.

Research Assistant, Griffith University, Brisbane, Australia July 2017 – Aug. 2017

- Worked under the guidance of Prof. Andre Carvalho.
- Attended and presented at group meetings at the Center for Quantum Information and Control.
- Developed and applied chaos control methods to classical and quantum chaotic systems.
- Studied the effects of measurement back-action on quantum chaotic trajectories.

NSF REU Research Assistant, Purdue University, Dept. of Physics June 2016 – Aug. 2016

- Worked under the guidance of Prof. Andrew Mugler.
- Attended and presented at meetings of the theoretical biophysics group.
- Modeled heterogeneous electrical signaling in bacterial communities.
- Set up and analyzed computer simulations in C solving coupled differential equations.

AWARDS AND HONORS

Rose Hills Fellowship	2020
Jean Schmidt Prize, awarded for exemplifying enthusiasm for learning and love of people.	2019
Phi Beta Kappa	2019
Distinction in Physics	2019
Goldwater Scholarship	2018
Harriet Sheridan Endowed Prize, awarded for the best sophomore academic writing portfolio.	2018
Phi Beta Kappa First-year Prize	2016
Carleton College Dean's List	2016
National Merit Scholar	2015
National AP Scholar	2015

PUBLICATIONS

Accepted:

Y. Shi, S. Greenfield, and A. K. Pattanayak, Measurement Backaction Control of Quantum Dissipation in a Nonlinear Cavity-Based Duffing Oscillator, *Phys. Rev. A* 103, 052212 (2021).

J. Larkin, X. Zhai, K. Kikuchi, S. Redford, A. Prindle, J. Liu, S. Greenfield, A.M. Walczak, J. Garcia-Ojalvo, A. Mugler, G.M. Süel. Signal Percolation within a Bacterial Community. *Cell Systems* 7:2, (2018).

Submitted and under review:

G. Koolstra, N. Stevenson, S. Barzili, L. Burns, K. Siva, S. Greenfield, W. Livingston, A. Hashim, R. K. Naik, J. M. Kreikebaum, K. P. O'Brien, D. I. Santiago, J. Dressel, and I. Siddiqi, Monitoring fast superconducting qubit dynamics using a neural network. arXiv:2108.12023v1

L. Lin, M. Mikos, L. Bresque, S. Greenfield, J. Scott, A. Carvalho, and A. K. Pattanayak, Optimal energy harvesting at the edge of chaos: The role of dynamical invariants (submitted).

In preparation or on arxiv:

S. Greenfield, M. Waegell, L. Catani, M. Leifer, J. Dressel. On the impossibility of a local non-contextual model of non-interacting measurement (in preparation).

Y. Shi, S. Greenfield, J.K. Eastman, A.R.R. Carvalho, and A.K. Pattanayak. The effects of amplification of fluctuation energy scale by quantum measurement choice on quantum chaotic systems: Semiclassical analysis (2018). arXiv:1808.09593.

PRESENTATIONS

S. Greenfield, S. L. Barzili, and J. Dressel. Efficient simulation of non-Markovian qubit trajectories. Poster presented at: 22nd Annual SQUInT Workshop; 2020 February 8-10; Eugene, OR.

S. Greenfield and J. Dressel. Toy models of non-interacting measurement. Poster presented at: 21st Annual SQUInT Workshop; 2019 February 10-12; Albuquerque, NM.

S. Greenfield and J. Dressel. A local model of non-interacting measurement in an optical qubit. Poster presented at: Optics and Photonics Winter School, University of Arizona; 2019 January 5; Tucson, AZ.

S. Greenfield, A. Carvalho, and A.K. Pattanayak. Measurement-based control of quantum chaos. Poster presented at: 20th Annual SQuInT Workshop; 2018 February 22-24; Albuquerque, NM.

S. Greenfield, A. Carvalho, and A.K. Pattanayak. Measurement-based control of quantum chaos. Poster presented at: APS Conference for Undergraduate Women in Physics; 2018 January 12-14; Ames, IA.

S. Greenfield, A. Stepanenko, B.B. Pokharel, J.K. Eastman, A.R.R. Carvalho, A.K. Patanayak. Semiclassical and quantum control of chaos. Poster presented at: 19th Annual SQuInT Workshop; 2017 February 23; Baton Rouge, LA.

S. Greenfield, A. Stepanenko, B.B. Pokharel, J.K. Eastman, A.R.R. Carvalho, A.K. Patanayak. Controlling Chaos in the Duffing Oscillator. Poster presented at: APS Conference for Undergraduate Women in Physics; 2017 January 13-15; Madison, WI.

S. Greenfield, X. Zhai, and A. Mugler. Communication in Bacterial Communities. Poster presented at: St. Olaf - Carleton Physics Poster Session; October 2016; Northfield, MN.

S. Greenfield and A. Mugler. Variability and Double Spiking Behaviors in Bacterial Biofilms. Talk given at: Purdue Physics REU presentation session; August 2016; West Lafayette, IN.

OTHER PROFESSIONAL / LEADERSHIP EXPERIENCE

Writing Consultant, Carleton College Writing Center Sep. 2016 – June 2019

- Tutored peers in academic and professional writing through drop-in and scheduled appointments.
- Worked closely with students and professors in writing-intensive classes.
- Tutored ESL students one-on-one in a long-term program.

Problem Solving Facilitator, Carleton Physics Department Jan. 2018 – June 2019

- Facilitated collaborative and welcoming problem-solving sessions for physics students.
- Guided students through problem-solving strategies and explained concepts covered in class.

Women in Physics+ Co-leader, Carleton Physics Department Sep. 2018 – June 2019

- Organized social and professional-development events for women and non-binary students interested in physics.
- Oversaw the creation of DiversiTea, a discussion group dedicated to raising awareness of issues faced by minorities in STEM and providing support for diverse groups in physics.

Technology Support Assistant, Carleton ITS Helpdesk Sep. 2015 – March 2018

- Troubleshoot hardware, software, and network problems for students, faculty, and staff.
- Answered phones, managed ticket queue, and maintained public labs.
- Expanded ITS wiki documentation by writing and editing articles.

OTHER SKILLS AND INTERESTS

Computing skills:

Proficient in Julia, Mathematica, xmds2, Microsoft Office, GSuite.

Familiar with Java, Python, C, command line, cluster computing.

Spanish proficiency: Four years language study and two summers language and cultural immersion.

Classical piano study and performance (2003 – 2019).

Original **anthropology fieldwork** on Ambedkarite Buddhism and 30 page research paper. (Fall 2017)

Two years residential practice at Zen Center of Los Angeles (Fall 2019 – present).