Sara Sussman

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Education

2018-present **Ph.D, Physics,** Princeton University.

2018 **B.A.** Summa Cum Laude, **Physics,** Boston University.

Selected Publications

See all on Google Scholar here

2022

The QICK (Quantum Instrumentation Control Kit): Readout and control for qubits and detectors
L. Stefanazzi, ..., S. Sussman, et al.
Review of Scientific Instruments **93**, 044709 (2022)

2021

New material platform for superconducting transmon qubits with coherence times exceeding 0.3 milliseconds
A. P. M. Place, L. V. H. Rodgers, ..., S. Sussman, et al.
Nat Commun **12**, 1779 (2021)

2018

Dinucleon and Nucleon Decay to Two-Body Final States with no Hadrons in Super-Kamiokande
Super-Kamiokande Collaboration: S. Sussman, et al.
arXiv, 1811.12430

Experience

Professional

2019-present **Graduate Researcher,** Princeton University.
Work on the design, fabrication and control of superconducting qubits under the supervision of Andrew Houck.

2019-2020 **Lab Instructor and Teaching Assistant,** Princeton University.

2016-2018 **Undergraduate Researcher,** Boston University.
Worked on prototyping FPGA-based front-end electronics and upgrading the high voltage system of the Super-Kamiokande neutrino detector under the supervision of Ed Kearns.

2016 **Undergraduate Researcher,** Harvard University.
Created a website and algorithms for ATLAS collaborators to find potentially malfunctioning hardware in the muon spectrometer under the supervision of Melissa Franklin.

Awards

2019-2020 Physics Department Teaching Award, Princeton University

2020 National Defense Science and Engineering Graduate Fellowship, Department of Defense

2020 Graduate Research Fellowship, National Science Foundation (Declined)

2018-2019 Van Zandt Williams, Sr., *41 Fellowship, Princeton University

2018 Joseph Henry Merit Prize, Princeton University

2018 College Prize in Physics, Boston University

Presentations

2022 Apr **Talk,** *Exploring quantum computing with an open source controller*
Princeton EDI Committee Research Talk Series

2022 Mar **Talk,** *The QICK (Quantum Instrumentation Control Kit)*
APS March Meeting

2021 Nov **Talk,** *The QICK (Quantum Instrumentation Control Kit)*
QMat Cafe | Academic and Industry, University of Strasbourg

2021 Nov **Talk,** *Scalable qubit control with a fast perfect entangler*
ASU QuEST talk

2021 Oct **Talk,** *Scalable qubit control with a fast perfect entangler*
EPiQC monthly talk

2021 Mar **Talk,** *FPGA-based optimal control for two-qubit gates*
APS March Meeting

2021 Jan **Journal Club,** *Superconducting qubits made of tantalum*
ASU/JPL/MIT Quantum Journal Club

2020 Nov **Talk,** *FPGA-based control of a high-coherence superconducting qubit*
ASU Engineering Coffee Hour

Skills

Hardware: RF data acquisition and timing systems, digital and analog circuits, high voltage systems.

Programming: Python, C/C++, Verilog, VHDL, Mathematica, MATLAB.

Software: Xilinx Vivado Design Suite, ExpressPCB, Intel Quartus Prime.

Microfab: Photolithography (photomask and direct write), wet/dry etching, metal deposition, surface metrology (profilometer), imaging (x-ray photoelectron spectroscopy, scanning electron microscopy).

Courses Taught

2020 Spring Princeton PHY 109: Mechanics and Electromagnetism - TA

2019 Fall Princeton ELE 308: Electronic and Photonic Devices - TA

2019 Summer Princeton EGR 150: Foundations of Engineering - Lab Instructor (link)

Student Projects Mentored

2021-2022 Hoang Le, "Towards a 2D Superconducting Kerr-cat Qubit"

2021 Summer Inci Karaaslan, "Cross-Entropy-Style Benchmarking of a 13 ns Perfect Entangler"

2020 Spring Connie Miao, "Developing A Serial Port FIFO on an iCE40 FPGA to Prototype Superconducting Qubit Control Feedback Loops"

2019 Summer Petru Cotrut, "FPGA-based Hardware Averaging and Active Reset with the Keysight M9010A PXI Chassis"

Academic Service

2022 Session Chair, APS March Meeting.

2021-present Reviewer, Review of Scientific Instruments.

2018-present Organizer, Princeton Women in Physics, Princeton University.