

# DANIEL KAMRATH WEISS

July, 2025

## PERSONAL INFORMATION

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Quantum Circuits Inc.  
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New Haven, Connecticut 06520

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*GitHub:* [link](#)  
*Google Scholar:* [link](#)

## RESEARCH INTERESTS

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Superconducting circuits, noise/error protected qubits, novel gates for protected qubits, fluxonium, quantum random access memory (QRAM), superconducting circuit readout, bosonic-mode QEC

## CURRENT POSITION

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**Quantum Circuits Inc.**  
Quantum Engineer (Physicist)

New Haven, CT  
2025 - Present

## WORK EXPERIENCE

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**Yale Quantum Institute**  
Postdoctoral Associate  
Advisors: Steven Girvin and Shruti Puri

New Haven, CT  
2022 - 2024

## EDUCATION

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**Ph.D., Northwestern University**  
*Department of Physics and Astronomy*  
Thesis: *Control and coherence of next-generation superconducting qubits*  
Advisor: Jens Koch

Evanston, IL  
2017 - 2022

**B.A., Wesleyan University**  
*Department of Physics*  
High Honors  
Thesis: *Phase transitions of charged particles in a Paul trap*  
Advisor: Reinhold Blümel

Middletown, CT  
2013 - 2017

## PUBLICATIONS IN PREPARATION

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1. Y. Lu, K. Smith, **D. K. Weiss**, X. You, Y. Zhang, S. Ganjam, A. Maiti, J. Garmon, I. Shem, J. Koch, S. Girvin, R. Schoelkopf, “Numerically modeling the Hamiltonian of a microwave-driven superconducting circuit”
2. S. Hazra\*, W. Dai\*, **D. K. Weiss\***, P. D. Parakh, M. Devoret, “Optimization of the readout frequency to mitigate leakage in superconducting circuits”
3. A. Maiti, J. O. Garmon, T. Tsunoda, **D. K. Weiss**, Y. Lu, R. J. Schoelkopf, “Dynamically modulated light-matter interactions for fault-tolerant bosonic control”
4. Q. Rumman Rahman, S. M. Girvin, **D. K. Weiss**, “Measurement-free QEC with superconducting cavities”

## PUBLICATIONS

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1. H. K. Babla, J. D. Teoh, J. Claes, **D. K. Weiss**, S. Singh, R. J. Schoelkopf, S. Puri, “Fault-tolerant Fusion-based Quantum Computing with the Four-legged Cat Code” [arXiv \(2025\)](#)
2. W. Dai\*, S. Hazra\*, **D. K. Weiss\***, P. D. Kurilovich, T. Connolly, H. K. Babla, S. Singh, V. R. Joshi, A. Z. Ding, P. D. Parakh, J. Venkatraman, X. Xiao, L. Frunzio, M. H. Devoret, “Spectroscopy of drive-induced unwanted state transitions in superconducting circuits” [arXiv \(2025\)](#)
3. T. Connolly, P. D. Kurilovich, V. D. Kurilovich, C. G. L. Böttcher, S. Hazra, W. Dai, A. Z. Ding, V. R. Joshi, H. Nho, S. Diamond, **D. K. Weiss**, Valla Fatemi, Luigi Frunzio, Leonid I. Glazman, Michel H. Devoret, “Full characterization of measurement-induced transitions of a superconducting qubit” [arXiv \(2025\)](#)
4. Quantum Circuits Inc. Team, “Bias-preserving and error-detectable entangling operations in a superconducting dual-rail system” [arXiv \(2025\)](#)
5. P. D. Kurilovich, T. Connolly, C. G. L. Böttcher, **D. K. Weiss**, S. Hazra, V. R. Joshi, A. Z. Ding, H. Nho, S. Diamond, V. D. Kurilovich, W. Dai, V. Fatemi, L. Frunzio, L. I. Glazman, M. H. Devoret, “High-frequency readout free from transmon multi-excitation resonances” [arXiv \(2025\)](#)
6. R. Baskov, **D. K. Weiss**, S. M. Girvin, “Exact amplitudes of parametric processes in driven Josephson circuits” [arXiv \(2025\)](#)
7. **D. K. Weiss**, S. Xu, S. Puri, Y. Ding and S. M. Girvin, “Faulty towers: recovering a functioning quantum random access memory in the presence of defective routers” [arXiv \(2024\)](#)
8. **D. K. Weiss**, S. Puri and S. M. Girvin, “Quantum random access memory architectures using superconducting cavities,” [PRX Quantum \(2024\)](#)
9. H. Zhang, C. Ding, **D. K. Weiss**, Z. Huang, Y. Ma, C. Guinn, S. Sussman, S. P. Chitta, D. Chen, A. A. Houck, J. Koch, D. I. Schuster, “Tunable inductive coupler for high fidelity gates between fluxonium qubits,” [PRX Quantum \(2023\)](#)
10. J. Bryon, **D. K. Weiss**, X. You, S. Sussman, X. Croot, Z. Huang, J. Koch and A. A. Houck, “Time-dependent magnetic flux in devices for circuit quantum electrodynamics,” [Phys. Rev. Applied \(2023\)](#) (Editor’s Suggestion)
11. **D. K. Weiss**, H. Zhang, C. Ding, Y. Ma, D. I. Schuster and J. Koch, “Fast high-fidelity gates for galvanically-coupled fluxonium qubits using strong flux modulation,” [PRX Quantum \(2022\)](#)
12. **D. K. Weiss**, W. DeGottardi, J. Koch and D. G. Ferguson, “Variational tight-binding method for simulating large superconducting circuits,” [Phys. Rev. Research \(2021\)](#)
13. H. Zhang, S. Chakram, T. Roy, N. Earnest, Y. Lu, Z. Huang, **D. K. Weiss**, J. Koch and D. I. Schuster, “Universal fast-flux control of a coherent, low-frequency qubit,” [Phys. Rev. X \(2021\)](#)
14. **D. K. Weiss**, Andy C. Y. Li, D. G. Ferguson and J. Koch, “Spectrum and coherence properties of the current-mirror qubit,” [Phys. Rev. B \(2019\)](#) (Editor’s Suggestion)
15. Y.S. Nam, **D. K. Weiss** and R. Blümel, “Explicit, analytical radio-frequency heating formulas for spherically symmetric nonneutral plasmas in a Paul trap,” [Phys. Lett. A \(2017\)](#)
16. **D. K. Weiss**, Y.S. Nam and R. Blümel, “Lifetimes of metastable ion clouds in a Paul trap: power-law scaling,” [Phys. Rev. A \(2016\)](#)

\* Equal contribution

## OPEN-SOURCE SOFTWARE

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### Author

- [qontrol](#): Quantum optimal control leveraging dynamiqs, diffrax and jax

- **floquet**: Explore nonlinear resonances in quantum systems

#### Coauthor

- **dynamiqs**: Added sepropagator, mepropagator, floquet, jssesolve; helped refactor solver internals

#### Contributor

- QuTiP, ScQubits, Matplotlib

## HONORS, PRIZES AND FELLOWSHIPS

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**Quantum Computing Graduate Research Fellowship**, funded by the Army Research Office, 2019-2022

**Bertman Prize**, Wesleyan University, 2017

Awarded to a senior majoring in physics who displays a particularly resourceful and creative approach to physics research

**Phi Beta Kappa**, Wesleyan University, early election, Fall 2016

**Karl van Dyke Prize**, Wesleyan University, 2016

Awarded each year to one or more students majoring in physical science who show outstanding achievement in academic work and a promise of productivity in a professional career

**Dean's List**, Wesleyan University, 2014-2017

## PROFESSIONAL SERVICE

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#### Journal refereeing

- PRX (2)
- PRX Quantum (2)
- Phys. Rev. Research (5)
- Phys. Rev. A (2)
- Npj Quantum Information (1)

#### Conference review

- QIP 2024

#### Session chair

- APS March Meetings 2022, 2023, 2024

**RQS student-postdoc council**, (2023-2024)

## CONTRIBUTED PRESENTATIONS

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1. **D. K. Weiss**, S. Puri, S. M. Girvin, "QRAM architectures using superconducting cavities," APS March Meeting 2024
2. **D. K. Weiss**, S. J. de Graaf, S. Xue, R. J. Schoelkopf, S. Puri, S. M. Girvin, "Towards a scalable QRAM architecture based on coupled bosonic modes," APS March Meeting 2023, D67.12
3. **D. K. Weiss**, Helin Zhang, Chunyang Ding, David I. Schuster and Jens Koch, "High-fidelity entangling gates for fluxonium qubits via flux modulation of a tunable coupler," APS March Meeting 2022, T41.05
4. **D. K. Weiss**, Wade DeGottardi, Jens Koch and D. G. Ferguson, "Tight binding as a numerical tool for diagonalizing superconducting-circuit Hamiltonians," APS March Meeting 2021, X30.02

5. **D. K. Weiss**, D. G. Ferguson, M. S. Khalil, Andy C. Y. Li, Jens Koch, “Numerical Methods for Current Mirror Qubit Simulations,” APS March Meeting 2019, B29.04
6. **D. K. Weiss**, Y.S. Nam and R. Blümel, “Discovery of an Unexpected Liquid Phase in the Periodically Driven Paul Trap,” APS March Meeting 2017, P13.09
7. **D. K. Weiss**, Y.S. Nam and R. Blümel, “Universal critical phenomena of the cloud crystal phase transition in the Paul trap: Powerlaws,” APS March Meeting 2016, X50.05

## INVITED PRESENTATIONS

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1. **D. K. Weiss**, “Introduction to Kraus operators and bosonic-mode based QEC,” ASCEND lecture series at YQI, July 2025
2. **D. K. Weiss**, “Faulty Towers: recovering a functioning QRAM in the presence of defective routers,” AFOSR MURI Review, September 2024
3. **D. K. Weiss**, “QRAM architectures using 3D superconducting cavities,” George Mason University Colloquium, April 2024
4. **D. K. Weiss**, “QRAM architectures using 3D superconducting cavities,” AFOSR MURI Review, October 2023
5. **D. K. Weiss**, “Quantum Computing in Practice,” Sievert Lectures at Northwestern University, February 2023
6. **D. K. Weiss**, J. Bryon, Z. Huang, X. You, Jens Koch, A. A. Houck, “Allocation of time-dependent flux: towards experimental verification,” Quantum Computing Program Review (QCPR), July 2021
7. **D. K. Weiss**, Wade DeGottardi, Jens Koch and D. G. Ferguson, “Tight binding as a numerical tool for diagonalizing superconducting-circuit Hamiltonians,” QCPR October 2020

## TEACHING EXPERIENCE

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### Yale University

Substitute lecturer: Quantum Information and Computation (2x, Spring 2023), Multivariable Calculus for Engineers (2x, Spring 2023), Quantum Optics (1x, Fall 2023), Introductory Physics (2x, Fall 2024)

### Northwestern University

Teaching Assistant: College Physics I (Fall 2018), College Physics II (Winter 2018-2019), College Physics III (Spring 2019)

### Wesleyan University

Teching Assistant: Principles of Chemistry (Fall 2014), General Physics II (Spring 2015), Quantum Mechanics I (Spring 2016), Vectors and Matrices (Fall 2016), General Physics I (Fall 2016), Quantum Mechanics I (Spring 2017)

Tutor: Scientific Computing and Informatics Center (2016-2017)

## MENTORING EXPERIENCE

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**Rumman Rahman**, Yale University 2022 - 2025  
Investigating measurement-free error-correction protocols using superconducting circuits

**Pranav Parakh**, Yale University 2023 - 2024  
Analyzing the Dimon superconducting circuit as a possible solution for the “readout problem”

**Ben McDonough**, Yale University 2022 - 2023  
Mentored in the analysis of superconducting circuits, resulting in the completion of a unitaryHACK challenge posted for squbits

**Elijah Hansen**, Northwestern University

2021 - 2023

Mentored in superconducting circuit theory and best practices for contributing to scqubits

**Athena Zheng and Sydney Wang**, Illinois Math and Science Academy

2018 - 2020

Introduced high-school students to quantum algorithms as well as introductory superconducting circuit theory

## REFERENCES

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Prof. Steven Girvin, Yale University

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Prof. Shruti Puri, Yale University

*Email:* shruti.puri@yale.edu

Prof. Jens Koch, Northwestern University

*Email:* jens-koch@northwestern.edu

Prof. David Schuster, University of Chicago

*Email:* david.schuster@uchicago.edu

Dr. David Ferguson, Northrop Grumman Corporation

*Email:* david.george.ferguson@ngc.com

Prof. Reinhold Blümel, Wesleyan University

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