

Stuart Wayland

*Researcher in quantum Hamiltonian complexity & randomized algorithms.
Founder, building patient discovery for clinical trials.*

Ph.D. student, University of California, Santa Cruz
Visiting Affiliate, Simons Institute, UC Berkeley
Co-founder, Krv Labs · Berkeley, California

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ABSTRACT. My research sits at the intersection of spectral graph theory, quantum Hamiltonian complexity, and randomized algorithms: classical algorithms for ground-state problems such as Quantum Max-Cut and the antiferromagnetic Heisenberg model, and the spectral theory of random graphs and expanders.

§1 Positions

PRESENT Visiting Affiliate — *Simons Institute for the Theory of Computing, UC Berkeley*

AUG 2026 – NOW Co-founder, Krv Labs, Inc. — *Berkeley, CA*

- One of three co-founders. Krv (trials.krv.ai) does patient discovery for rare and difficult-to-enroll clinical trials: it finds the candidates in hospital records that code-based filters miss, and gives investigators a ranked shortlist with the evidence for each match.
- Lead the mathematical foundations: cohorts learned from broad, de-identified data, time-series models of patient trajectories, and their distillation into interpretable rules.
- Backed by the NVIDIA Inception Program, Berkeley SkyDeck (PAD-13), and TUM Venture Labs Healthcare.

§2 Education

2022 – NOW Ph.D., Computer Science — *UC Santa Cruz*

Advisor: Alexandra Kolla. Classical and approximation algorithms for local Hamiltonians; sum-of-squares and SDP rounding; Markov chain mixing on expanders.

2018 – 2022 B.S. Mathematics & B.S. Computer Science — *UC Santa Barbara*

Minor in Music. Distinction in the Major (Computer Science); Dean's Honors List, 2019–2022.

§3 Publications

[1] Classical Algorithms for Bipartite Quantum Max-Cut on Dense Expanders

Stuart Wayland, Zackary Jorquera, and Alexandra Kolla

arXiv:2610.03670, 2026.

[2] Monogamy of Entanglement Bounds and Improved Approximation Algorithms for Qudit Hamiltonians

Zackary Jorquera, Alexandra Kolla, Steven Kordonowy, Juspreet Singh Sandhu, and **Stuart Wayland**

arXiv:2410.15544, 2024.

- [3] **Approximation Algorithms for Quantum Max- d -Cut**
 Charlie Carlson, Zackary Jorquera, Alexandra Kolla, Steven Kordonowy, and **Stuart Wayland**
arXiv:2309.10957, 2023. Poster at QIP 2024.
- [4] **Quantifying Gerrymandering with Simulated Annealing**
Stuart Wayland
arXiv:2209.00624, 2022. Undergraduate thesis (Distinction in the Major), UC Santa Barbara; talk at the UCSB CS Undergraduate Research Showcase.

§4 Teaching

2022 – NOW	Teaching Assistant — <i>UC Santa Cruz</i> Algorithms, Discrete Mathematics, Statistics, and C Programming. Weekly discussion sections of about 40 students; designed problem sets and lesson plans.
2018 – 2022	Private Tutor — <i>UC Santa Barbara</i> Differential equations, linear algebra, probability, and introductory programming.

§5 Earlier Experience

2022	Software Developer — <i>AlloSphere Research Facility, UCSB</i> C++ audio software for the <code>allolib</code> library; a library for automated multi-instrument accompaniment.
2021 – 2022	Undergraduate Researcher — <i>Gerrymandering Project, UCSB</i> MCMC and simulated-annealing methods for sampling districting plans and evaluating their fairness, with Prof. Eric Vigoda.

§6 Skills

RESEARCH	Spectral graph theory, SDP and sum-of-squares, Markov chain mixing, topological data analysis
ENGINEERING	Python, Rust, TypeScript, C/C++, Mathematica, Qiskit, $\text{\LaTeX}$
OTHER	NREMT-certified Emergency Medical Technician (2021); cellist

§7 References

Prof. Alexandra Kolla Computer Science, UC Santa Cruz akolla@ucsc.edu	Prof. Eric Vigoda Computer Science, UC Santa Barbara vigoda@ucsb.edu
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