

ZACHARY STIER
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EDUCATION

- **University of California, Berkeley**, PhD Candidate, Mathematics 8/2020–Present
Advised by Prof. Nikhil Srivastava
- **Princeton University**, AB with Honors, Mathematics 9/2016–6/2020
Certificate in Applications of Computing
Thesis: “Optimal topological generators of $U(1)$ and short paths in $X^{p,q}$ and $SU(2)$,”
advised by Prof. Peter Sarnak

EMPLOYMENT & RESEARCH

- **UC Berkeley**, Graduate Student Instructor, Math 1B (Calculus) Fall 2020, Spring 2021
- **REU at University of Minnesota–Twin Cities** Summer 2019
Algebraic combinatorics research advised by Profs. Vic Reiner and Ben Brubaker
- **Princeton CS Department**, Grader, COS 326 (Functional Programming) Fall 2018
- **DIMACS REU at Rutgers University** Summer 2018
Number theory research advised by Prof. Alex Kontorovich
- **Princeton Physics Department**, Intern Summer 2017
Prepared FPGA modules for PHY 312 (Experimental Physics)
- **Princeton Plasma Physics Laboratory**, Intern 9/2015–6/2016
Created sea salinity visualizations from Geophysical Fluid Dynamics Laboratory data

VOLUNTEER & ORGANIZATIONAL EXPERIENCE

- **UC Berkeley Student Discrete Analysis Seminar**, Co-Organizer 2022 and 2023
- **Student seminar on quantum theory**, Co-Organizer Fall 2022
- **UC Berkeley Mathematics Directed Reading Program**, Mentor Fall 2022, Spring 2023
- **Mount Tamalpais College**, Mathematics Tutor and Study Group Leader 3/2022–10/2023
Tutor for math courses at college operating in San Quentin State Prison
- **Princeton Math Club**, President 2019
Co-Academic Chair 2018
- **Princeton University Math Competition**, Head Problem Czar 2017
Problem Czar 2016–2019
- **YMath**, ymathtutoring.com, Founder & Executive Director 2013–Present
501(c)(3) provides free tutoring to socioeconomically disadvantaged students

HONORS & AWARDS

- UC Berkeley **Outstanding Graduate Student Instructor Award** 2021
- **Middleton Miller '29 Prize** from the Princeton Mathematics Department, 6/2020
for best independent work
- **National Science Foundation Graduate Research Fellowship** 2020–2025
- **National Defense Science and Engineering Graduate Fellowship** (declined) 2020–2023
- **Putnam Competition top 500 scorer** 2017, 2019
- **Diller Teen *Tikkun Olam* Award**, for YMath 2016

PAPERS & PREPRINTS

- **On the Ground State Energies of Discrete and Semiclassical Schrödinger Operators.** 2024. [arXiv:2405.05907](https://arxiv.org/abs/2405.05907). Submitted.
With I. Detherage and N. Srivastava.
- **A no-go result for pure state synthesis in the DQC1 model.** 2024. [arXiv:2404.04198](https://arxiv.org/abs/2404.04198).
- **A Ricci flow on graphs from effective resistance.** 2024. [arXiv:2403.01151](https://arxiv.org/abs/2403.01151). Submitted.
With A. Dawkins, V. Gupta, M. Kempton, W. Linz, J. Quail, and H. Richman.
- **Node resistance curvature in Cartesian graph products.** 2024. [arXiv:2403.01037](https://arxiv.org/abs/2403.01037). Submitted.
With A. Dawkins, V. Gupta, M. Kempton, W. Linz, J. Quail, and H. Richman.
- **A Quantum Algorithm for Functions of Multiple Commuting Hermitian Matrices.** 2023. [arXiv:2302.11139](https://arxiv.org/abs/2302.11139). Submitted.
With Y. Borns-Weil and T. Saffat.
- **Fast Navigation with Icosahedral Golden Gates.** 2023. In *Quantum Information and Computation* 23:11&12, doi.org/10.26421/QIC23.11-12-1.
With T. Blackman.
- **Dihedral Sieving on Cluster Complexes.** 2021. In *Enumerative Combinatorics and Applications* 2:2, ecajournal.haifa.ac.il/Volume2022/ECA2022_S2A9.pdf.
With J. Wellman and Z. Xu.
- **Short paths in $PU(2)$.** 2021. In *Quantum Information & Computation* 21:9&10, doi.org/10.26421/QIC21.9-10-3.
- **Optimal topological generators of $U(1)$.** 2020. In *Journal of Number Theory* 214, doi.org/10.1016/j.jnt.2020.02.003.
- **Metaplectic Analogues of Gelfand–Graev Models.** 2019. REU report.
With Q. Dao, N. Kenshur, F. Lin, C. Meng, and C. Yost-Wolff.
- **A Proposed KDM-Secure Scheme to Evaluate k -DNF Formulas.** 2019. Junior paper.
- **A Taxonomy of Crystallographic Sphere Packings.** 2019. In *Journal of Number Theory* 207, doi.org/10.1016/j.jnt.2019.07.007.
With D. Chait-Roth and A. Cui.

SKILLS: Mathematica, Python, \LaTeX , Haskell, OCaml, GAP

REFEREEING & SUBREVIEWING: *Journal of Number Theory*, ITCS, STOC

CONFERENCES, WORKSHOPS, & TALKS

- **Non-commutative Function Theory and Free Probability** 4–5/2024
Mathematisches Forschungsinstitut Oberwolfach, Oberwolfach, Germany
Supported by Oberwolfach Leibniz Graduate Students grant
- **Mathematical Aspects of Quantum Mechanics** (winter school) 1/2024
Institut de Mathématiques de Toulouse, Toulouse, France
- **Centre for Quantum Information and Foundations Seminar** (invited talk) 1/2024
University of Cambridge, Cambridge, England
- **Colloquium** (invited talk) 12/2023
Medgar Evers College, Brooklyn, NY
- **Quantum Computation** (summer school) 7–8/2023
Park City Mathematics Institute, Park City, UT
- **Mathematical Research Community on Ricci Curvatures of Graphs** 5–6/2023
American Mathematical Society, Java Center, NY
- **American Mathematics Society Special Session on Quaternions** (invited talk) 1/2023
Joint Mathematics Meetings, Boston, MA
- **Spectral independence and entropy decay** (summer school) 8/2022
UC Santa Barbara, Santa Barbara, CA
- **Number Theory Informed by Computation** (summer school) 7–8/2022
Park City Mathematics Institute, Park City, UT
- **American Mathematics Society Special Session on Quaternions** (invited talk) 4/2022
Joint Mathematics Meetings, Seattle, WA (virtual)
- **New Trends in Quaternions and Octonions** (talk) 11/2021
Universidade de Trás-os-Montes e Alto Douro, Vila Real, Portugal (virtual)
- **Arithmetic reflection groups and crystallographic packings** 12/2020
American Institute of Mathematics, San Jose, CA (virtual)
- **Heidelberg Laureate Forum** (Young Researcher) 9/2019
HLF Foundation, Heidelberg, Germany
- **Young Mathematicians Conference** (poster presentation) 8/2018
The Ohio State University, Columbus, OH