

Kyle Fridberg

(720) 884-6986 | kof4@cornell.edu | website: kofridberg.github.io

Education

CORNELL UNIVERSITY

Applied Mathematics PhD student

Expected graduation: May 2028

HARVARD UNIVERSITY

B.A. in Chemistry & Physics and Mathematics (GPA 3.81/4.00)

Cum Laude in Field, May 2023

- Relevant coursework: numerical methods, physical mathematics, partial differential equations, random matrix theory, dynamical systems, differential geometry, vector calculus, linear algebra, probability, complex analysis, real analysis, abstract algebra, physics (quantum mechanics, classical mechanics, wave mechanics, electricity and magnetism), chemistry (organic, inorganic, statistical thermodynamics).

Research

HARVARD UNIVERSITY

Independent Math Research (September 2019–May 2023)

- Discovered a family of spirals made of regular n -gons and proved a convergence result. Publication: **K. Fridberg**. [A regular \$n\$ -gon spiral](#). *Rocky Mountain Journal of Mathematics*. Accepted August 2023 (in press).
- Delivered oral presentations of my work involving regular n -gon spirals and partitioning divergent Dirichlet series at Harvard's Math Table (an undergraduate math colloquium series).

Prof. Michael Brenner Group (May 2021–November 2021)

- Wrote a cellular automata model for mutualistic microbial communities in Python.
- Developed functionality to introduce mutants in the cellular automata and analyze the results.
- Publication: S. van Vliet, C. Hauert, **K. Fridberg**, M. Ackermann, A. Dal Co. (2022) [Global dynamics of microbial communities emerge from local interaction rules](#). *PLOS Computational Biology* 18(3): e1009877.

Prof. Mikhail Lukin Lab Group (March 2020–November 2020)

- Developed Python [program](#) that efficiently optimizes microwave pulse generation for driving SiV spin qubits.
- Interfaced with lab devices to conduct remote optimization tests.

Prof. Theodore Betley Lab Group (February 2019–February 2020)

- Synthesized and characterized triiron clusters to examine reactivity with small-molecule substrates.

UNIVERSITY OF COLORADO BOULDER

Prof. Mark Ablowitz Group (June 2022–October 2022)

- Derived adjoint operator and adjoint eigenfunctions for discrete Schrodinger scattering problem.
- We obtained an exactly-solvable fractional generalization of the Toda lattice equation. Manuscript in preparation.

Home Chemistry Lab / Prof. Michael Marshak Lab Group (June 2016–May 2018)

- Synthesized a novel mixed iron/manganese sulfate compound (hydrogen ferric manganic sulfate).
- Delivered oral presentation at the August 2018 American Chemical Society national meeting in Boston.

POLYMATH REU (June 2021–August 2021)

- Working with Prof. Yunus Zeytuncu, I used Blaschke products to derive a novel, simple formula for the isogonal conjugate point in triangles (see result on projects page of my website).

Skills

Technical: Mathematica, Python, MATLAB, LaTeX, GitHub, some familiarity with C++, Julia, Java, and POV-Ray.

Research: Scientific computing, stochastic optimization, implementing stochastic cellular automata, implementing a [particle-in-cell](#) (PIC) plasma model, numerical integration and differentiation, numerical linear algebra, computing asymptotics of sums and integrals, algebraic manipulations, series manipulations and exact evaluation.

Additional: Creative problem solving, pattern recognition, presenting results orally and in writing with good clarity of exposition.

Honors and Awards

- Cornell Fellowship—a 1-year merit-based research fellowship (2023)
- Regeneron Science Talent Search—6th Place (2018)
- Intel International Science and Engineering Fair—1st and Best in Chemistry Category (2017)
- Colorado Science and Engineering Fair—1st Place in Environmental Sciences (2016)
- USA Climbing Youth National Championships—placed top 30 (2013–2016)