Clyde Kertzer

University of Colorado, Boulder

clyde.kertzer@colorado.edu clydekertzer.com (303) 601-0860

EDUCATION

B.S. Mathematics (Honors), *summa cum laude* — expected May 2025
University of Colorado, Boulder
Honors Thesis: *Parameterizations of Descartes Quadruples*
Advisors: Katherine Stange & James Rickards

PUBLICATIONS

The Local-Global Conjecture for Apollonian circle packings is false
With Summer Haag, James Rickards, and Katherine E. Stange
arXiv:2307.02749 | Quanta Magazine | github code | github data | talk
To appear in Annals of Mathematics

RESEARCH EXPERIENCE

Gallery of Theorems — Spring 2024
- Aim: Represent mathematics concepts using artistic mediums
- Further developed Numberscope visualizer to increase functionality
- Advisor: Professor Sarah Peterson

Independent Study - Parameterizations of Descartes Quadruples — Fall 2023
- Developed honors thesis on Descartes quadruples of Apollonian circle packings
- Advisors: Professor Kate Stange, Professor James Rickards

CU Boulder REU - Apollonian Circle Packings — Summer 2023
- Disproved the Local-Global Conjecture for Apollonian Circle Packings
- Preprint led to an article in Quanta Magazine
- Advisors: Professor Kate Stange, Professor James Rickards

Honors Independent Study - Elliptic Curves — Spring 2023
- Reading course over *Rational Points on Elliptic Curves*, Silverman & Tate
- Advisor: Professor David Grant

Numberscope - Research Assistant and Developer — Fall 2022
- Developed the Numberscope website to improve user experience
- Programmed visualizer that represents Collatz length of user-selected sequences from the OEIS using a scaled color gradient & a modular-controlled array
- A collage of my visualizer won the 2023 CU Arts & Sciences art contest
- Advisor: Professor Kate Stange

Independent Study - Quadratic Reciprocity — Fall 2021
- Reading course over *An Introduction to the Theory of Numbers*, Niven, Zuckerman, & Montgomery
- Advisor: Professor Paul Hagelstein

WORK EXPERIENCE

Grader - CU Boulder

- Analysis 1 - Professor Alonso Delfin — Summer 2024
- Discrete Mathematics - Professor James Rickards — Spring 2024
  Analysis 1 - Professor Sean O'Rourke
- Linear Algebra - Professor David Grant — Fall 2023
  Discrete Mathematics - Professor Nat Thiem
  Analysis 1 - Professor James Rickards
- Discrete Mathematics - Professor David Grant — Spring 2023

Math Tutor - Prep Academy — Aug 2024 - Present

- Teach study, note-taking, & test-taking skills
- Assess students' progress throughout tutoring sessions

Math Tutor - Private — Aug 2019 - Present

- Teach study, note-taking, & test-taking skills
- Assess students' progress throughout tutoring sessions

CONFERENCES

CTNT, UConn, CT — Jun 14-16, 2024
Gave a talk on local-global of Apollonian circle packings

CU Topology Day, Boulder, CO — Apr 23, 2024

Undergraduate Research Expo, Boulder CO — Apr 20, 2024
Presented a poster on local-global of Apollonian circle packings

Front Range Number Theory Day, Boulder, CO — Apr 13, 2024

Joint Mathematical Meetings, San Francisco, CA — Jan 3-6, 2024
Presented a poster on local-global of Apollonian circle packings

Math For All, Boulder, CO — Apr 6, 2024
Presented a poster on local-global of Apollonian circle packings

TEACHING & TALKS

21st Century Mathematics - an online math teachers conference — Jun 28, 2024
With Summer Haag & Kate Stange | slides

CTNT 2024 - The Local-Global Conjecture — Jun 15, 2024
With Summer Haag | slides

Honors Thesis Defense — Apr 10, 2024
Title: *Parameterizations of Descartes Quadruples*

IISER Bhopal - "Problems of Old" (online) — Oct 10, 2023
talk | slides

50-minute Class Lecture (MATH 2135 - Linear Algebra) — Sep 8, 2023
Topic: matrix equations & homogeneous linear systems
Professor Richard Green.

50-minute Class Lecture (MATH 2135 - Linear Algebra) Sep 1, 2023
Topic: solutions to linear systems & vectors

Professor Richard Green.

CU Boulder REU - Apollonian Circle Packings Jun 15, 2023
slides

LEADERSHIP & OUTREACH

COSMOS Math Club Leadership Summer 2024 - Present

College Day Student Panel - Speaker Aug 28, 2024
Representing the mathematics major

Mesa Elementary 4th grade math Aug 27, 2024
Topic: Prime factorization & basic Cryptography

Undergraduate Involvement Panel - Speaker Feb 14, 2024
Cosmos Math Club

Mesa Elementary 4th grade math Mar 24, 2023
Topic: What is infinity? What is an infinite sum?

COURSEWORK

Fall 2024
- MATH 3170 - Combinatorics
- MATH 4230 - Differential Geometry
- MATH 6310 - *Graduate* Introduction to Real Analysis 1
- MATH 6210 - *Graduate* Introduction to Topology

Spring 2024
- MATH 4330 - Fourier Analysis
- MATH 6140 - *Graduate* Algebra 2
- MATH 6350 - *Graduate* Functions of a Complex Variable 1
- MATH 8114 - *Graduate* Number Theory & Ergodic Theory
- MATH 8174 - *Graduate* Mathematical Cryptography

Fall 2023
- MATH 4440 - Mathematics of Coding and Cryptography
- MATH 6130 - *Graduate* Algebra 1
- MATH 6190 - *Graduate* Analytic Number Theory

Spring 2023
- MATH 3210 - Euclidean & Non-Euclidean Geometry
- MATH 4140 - Abstract Algebra 2

Fall 2022
- MATH 4001 - Analysis 2
- MATH 6110 - *Graduate* Intro to Number Theory

Summer 2022
- MATH 3140 - Abstract Algebra 1

Spring 2022 (transferred to CU Boulder)
MATH 3001 - Analysis 1
MATH 3110 - Intro to Number Theory
MATH 3450 - Intro to Complex Variables

Fall 2021 (at Baylor University)
MTH 2311 - Linear Algebra
MTH 3300 - Foundations of Mathematics
MTH 3325 - Ordinary Differential Equations

AWARDS

Robert and Wanda Gunning Endowed Fund — Fall 2024 - Spring 2025
$2,500 per year

President Joseph A. Sewall Award — Spring 2022 - Spring 2025
$5,000 per year

Invitation to Excellence (Baylor) — Fall 2021
$20,000 per year

MEDIA

Two Students Unravel a Widely Believed Math Conjecture
Article about *The Local-Global Conjecture for Apollonian circle packings is false*
Quanta Magazine

CU students follow their noses, disprove math conjecture
Article about *The Local-Global Conjecture for Apollonian circle packings is false*
CU Arts & Sciences Magazine

LANGUAGES

LaTeX - Fluent
Sage - Intermediate
Pari/GP - Intermediate
Magma - Beginner
Javascript/Typescript - Intermediate

EXTRACURRICULARS

Cosmos Math Club
Student Lead

Math Club QED

Mobius Math Society (Baylor)