

SUMMER HAAG

summer.haag@colorado.edu

Research Interests: Circle packings, Binary Quadratic Forms, arithmetic groups, continued fractions, illustrating mathematics

EDUCATION

University of Colorado at Boulder, Boulder CO

August 2022 — Present

PhD candidate

MA in mathematics, Fall 2024

Illustration as a Mathematical Research Technique Trimester, Paris

Spring 2026

- Three month long Trimester Program focusing on illustrating mathematics through computers, fabric, paper, etc. at Insitut Henri Poincaré along with multiple workshops

University of Georgia, Athens GA

August 2018 — May 2022

BA in mathematics

PUBLICATIONS & PREPRINTS

Repellent properties of perfect powers on partition functions: a heuristic approach

S. Haag, P. Samanta, Swati, H Swisher, S Treneer, R Visser

Research in Mathematical Science (accepted) (arxiv)

The local-global conjecture for Apollonian circle packings is false

S. Haag, C. Kertzer, J. Rickards, K. Stange

Annals of Mathematics (arxiv, eprint)

Computational study of non-unitary partitions

A.P. Akande, T. Genao, S. Haag, M. Hendon, N. Pulagam, R. Schneider, A. Sills

J. of the Ramanujan Mathematical Society (arxiv)

The error term in counting prime pairs

L. Chou, S. Haag, J. Huryn, A. Ledoan

J. of Number Theory (arxiv eprint)

INVITED CONFERENCE TALKS

Local-global Conjecture for Apollonian Circle Packings

CT Number Theory

UConn

June 2024

AWARDS & NOMINATIONS

Quanta Magazine- Research Feature

Featured in an article in Quanta Magazine by Max G. Levy covering the Local-Global Conjecture for Apollonian circle packings. (Article reference)

Laureate of the QRT Welcome Package

Received a grant of 3000€, funded by Qube Research and Technologies and administered by the IHP Endowment fund, set aside to promote the participation of women in IHP's scientific programs.

2025 Throne Summer Fellowship

Received 7,000 in summer funding for research

UGA Strahan Award

Nominated by professors for excellence in mathematics as a junior in undergraduate.

CURO Assistantship

Received 1,000 at UGA for research in Number Theory to present at the CURO Symposium.

The Hollingsworth Award

Nominated and recieved at UGA for excellence in Math.

SEMINARS AND OTHER TALKS

Overview of Local-to-Global Conjecture for Apollonian Circle Packings Math for All	CU Boulder April 2024
Local-to-Global Conjecture for Apollonian Circle Packings Dynamics Seminar	University of Houston May 2025
Local-to-Global Conjecture for Apollonian Circle Packings Algebra and Number Theory Seminar	Oregon State University October 2025
The Parameter Space of Apollonian Circle Packings Geometry Seminar	Aix Marseille University March 2026

INVITATIONAL CONFERENCES AND WORKSHOPS

- CTNT Summer School and Conference 2024
- Joint Mathematics Meeting 2025 — Organizer for Special Session on Local-to-Global in Apollonian Circle Packings and Beyond.
- Rethinking Number Theory 6
- Higher Dimensional Hyperbolic Geometry Workshop 2025
- Illustration as a Mathematical Research Technique CIRM
- Rigorous Illustrations - Their creation and evaluation for mathematical research
- Bridging visualisation and understanding in Geometry and Topology
- Integrating Research and Illustration in Number Theory

CONFERENCES ATTENDED

- Math for All 2023, 2024

- Integers Conference 2025

TEACHING EXPERIENCE

Primary Instructor

University of Colorado Boulder

- Precalculus Fall 2025
- Calculus II Fall 2023, Summer 2024, Fall 2024

Calculus Teaching Assistant

University of Colorado Boulder

- Precalculus Spring 2025
- Calculus I Fall 2022
- Calculus II Spring 2023
- Calculus III Spring 2024

SageMath Workshop

Introduction into using SageMath at the Integrating Research and Illustration in Number Theory workshop with worksheet written by Katerine E. Stange

SERVICE & MENTORSHIP

No-Senior Seminar

A seminar at the Illustrations as a Mathematical Research Technique Trimester for graduate students and Post-docs to present topics

Organizer

Spring 2026.

Math Peer Mentorship

Older graduate students pair with first year graduate students

Mentor

Fall 2023 — Spring 2024.

Reading Groups

University of Colorado, Boulder

Organizer

- p -adic Analysis — Summer 2024.

Prelim Mentor Program— Algebra

Graduate student who has taken Algebra I and II and passed the Algebra Preliminary Exam guide graduate students in studying for the Algebra Preliminary Exam

Mentor

Summer 2025

Rabbit Rescue Grooming co-lead

Rocky Mountain House Rabbit Rescue

Organize and train a team to groom approximately 50 rabbits

Volunteer

Jan 2024-present

OPEN SOURCE SOFTWARE

Github

Public repository of code for research in Apollonian Circle Packings <https://github.com/summerhaag>