

Roy Zhao

PERSONAL INFORMATION

EMAIL: rhzhao@caltech.edu
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CITIZENSHIP: USA

EMPLOYEMENT

California Institute of Technology FALL 2023-PRESENT
Caltech–Tsinghua Joint Postdoctoral Fellow
Mentor: Elena Mantovan

EDUCATION

University of California-Berkeley, PhD, Mathematics AUGUST 2023
Advisor: Xinyi Yuan
Thesis Title: Results on Unlikely Intersection Problems

Princeton University, AB, Mathematics, *Summa Cum Laude*, *Phi Beta Kappa*, *Sigma Xi* MAY 2017
Minor: Computer Science
Senior Thesis Advisor: Chris Skinner
Thesis Title: An Elliptic Curve Based Perspective on the Arithmetic of Pell Conics
GPA: 3.95/4.00

ETH Zurich, Exchange Student FALL 2015
Thesis Advisor: Richard Pink
Thesis Title: The Class Number Formula for Quadratic Fields and Related Results

PAPERS AUTHORED

Heights of Special Points on Quaternionic Shimura Varieties, *submitted*, available at arXiv:2309.08886
Algebraic Varieties and Automorphic Functions, with Sebastian Eterović, *submitted*, available at arXiv:2017.10392.

AWARDS AND FELLOWSHIPS

Certificate of Teaching and Learning in Higher Education MAY 2021
UC Berkeley Summer Grant JULY 2020
Outstanding Graduate Student Instructor Award MARCH 2019
Sigma Xi Book Award MAY 2017
George B. Covington Prize in Mathematics MAY 2017
William-Lowell Putnam Competition Honorable Mention MAR 2017

TALKS

Invited

Heights on Quaternionic Shimura Varieties. Automorphic Forms and Representation Theory Seminar, Purdue University, 22 Feb 2024.

Heights on Quaternionic Shimura Varieties. Algebra and Number Theory Seminar, University of California–Los Angeles, 27 Nov 2023.

Existential Closedness Problems. Algebra and Number Theory Seminar, University of Rochester, 11 Nov 2021.

Solving Exponential-Algebraic Equations. Mathematics Teacher-Scholar Symposium, Reed College, 22 May 2021.

Complex Multiplication, BSD, Gross-Zagier, and Beyond. Number Theory Seminar, UC Berkeley, 14 Oct 2020.

Computation with Degree-Rips Bifiltrations. Tutorial on Multiparameter Persistence, Computation, and Applications, University of Minnesota, 15 Aug 2018.

Selected Other

Heights on Quaternionic Shimura Varieties. Number Theory Seminar, UC Berkeley, 26 Oct 2022.

Introduction to Shimura Varieties. Number Theory Seminar, UC Berkeley, 19 Oct 2022.

The Andre-Oort Conjecture for Shimura Varieties. Arithmetic Geometry Seminar, UC Berkeley, 29 Apr 2022.

The Uniform Bogomolov Conjecture. Number Theory Seminar, UC Berkeley, 20 Apr 2022.
Zeta Functions à la Langlands-Kottwitz. Number Theory Seminar, UC Berkeley, 21 Apr 2021.
Intersection of Varieties and Automorphic Forms. Arithmetic Geometry Seminar, UC Berkeley, 2 Apr 2021.
p-divisible Groups and Dieudonné Modules. Number Theory Seminar, UC Berkeley, 24 Sep 2020.
Ax-Schanuel for the j-Function. Number Theory Seminar, UC Berkeley, 1 Apr 2020.
Galois Orbits of Torsion Points. Number Theory Seminar, UC Berkeley, 18 Mar 2020.
The Ax-Schanuel Theorem. Number Theory Seminar, UC Berkeley, 19 Feb 2020.
The Chowla-Selberg Formula. Arithmetic Geometry Seminar, UC Berkeley, 25 Nov 2019.
The Gross-Zagier Formula. Number Theory Seminar, UC Berkeley, 1 May 2019.
Heegner Points. Number Theory Seminar, UC Berkeley, 24 Apr 2019.
Abelian Varieties over Finite Fields. Seminar on Faltings' Proof of the Mordell Conjecture, Peking University, 10 Oct 2018.
Class Field Theory and Tate Thesis. Number Theory Seminar, UC Berkeley, 20 Sep 2017.
An Elliptic Curve Based Perspective on the Arithmetic of Pell Conics. Thesis Defense, Princeton University, 12 May 2017.

OUTREACH ACTIVITIES

Caltech Number Theory Seminar, Organizer	FALL 2023-SPRING 2024
Caltech Number Theory Learning Seminar–Shimura Varieties, Organizer	WINTER 2024
Caltech Number Theory Learning Seminar–Abelian Varieties, Organizer	FALL 2023
Graduate Student Equity and Inclusion Coordinator	FALL 2021-SPRING 2023
Math, Physics, and Statistics Undergraduate Diversity, Equity, Inclusion, and Advancement Task Force, Member	FALL 2019-SPRING 2021
Unbounded Representation Student Group, President	SPRING 2019-SPRING 2023
Sexual Violence and Sexual Harassment Prevention Training, Instructor	FALL 2018-SPRING 2023
Berkeley Math Circle, Instructor	SPRING 2018-PRESENT
Math Taught the Right Way, Instructor	SPRING 2018-SPRING 2023
Berkeley Math Equity and Inclusion Committee, Member	FALL 2018-SPRING 2019
Berkeley Graduate Assembly, Representative	FALL 2017-SPRING 2018
Mercer County Math Circle, Organizer	SPRING 2015-SPRING 2017

CONFERENCES ATTENDED

AIM Workshop on Analytic, Arithmetic, and Geometric Aspects of Modular Forms, February 2024
 AIM Workshop on Arithmetic Intersection Theory on Shimura Varieties, January 2024
 Arizona Winter School on Unlikely Intersections (participant), March 2023
 Reed College Mathematics Teacher-Scholar Symposium (speaker), May 2021
 Arizona Winter School on Automorphic Forms Beyond GL_2 (participant), March 2021
 Arizona Winter School on Non-Abelian Chabauty (participant), March 2020
 Hawaii Number Theory (participant), March 2019
 Arizona Winter School on Topology and Arithmetic (participant), March 2019
 Tutorial on Multiparameter Persistence, Computation, and Applications (invited speaker), University of Minnesota, August 2018
 Arizona Winter School on Iwasawa Theory (participant), March 2018

TEACHING

California Institute of Technology

Instructor

Math 7, Elementary Number Theory	SPRING 2024
Math 120B, Graduate Algebra–Galois Theory	WINTER 2024

University of California, Berkeley

Lead Instructor

Math 74, Transition to Upper-Division Mathematics (Eval: 6.27/7)	FALL 2021
Math 10A, Calculus, Statistics, and Combinatorics (Eval: 6.53/7)	SUMMER 2018
<i>Graduate Student Instructor (GSI)</i>	
Math 74, Transition to Upper-Division Mathematics (Eval: 6.52/7)	FALL 2020

Math 113, Abstract Algebra	FALL 2019
Math 115, Number Theory (Eval: 6.17/7)	FALL 2019
Math 53, Multivariable Calculus	SUMMER 2019
Math 10B, Calculus, Statistics, and Combinatorics (Eval: 6.82/7)	SPRING 2017, SPRING 2018
Math 10A, Calculus, Statistics, and Combinatorics (Eval: 6.72/7)	FALL 2017

Princeton University

Undergraduate Teaching Assistant

MAT 346, Abstract Algebra II	SPRING 2017
MAT 335, Complex Analysis	FALL 2016
MAT 215, Introductory Real Analysis	SPRING 2016
MAT 218, Honors Introductory Multivariate Real Analysis	FALL 2014
MAT 216, Honors Introductory Real Analysis	FALL 2014

LANGUAGES

Native: English, Chinese

COMPUTER LANGUAGES

Intermediate Knowledge: Java, Python, C, C++, MATLAB, \LaTeX

Basic Knowledge: JavaScript, Linux environment, R