

# Zheng Liu

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## Contact Information

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## Research Interest

Number theory,  $p$ -adic properties of automorphic forms and special  $L$ -values, Iwasawa theory

## Employment

2020- Assistant Professor, the University of California, Santa Barbara  
2019-2020 Visiting Assistant Professor, the University of California, Santa Barbara  
2018-2019 Postdoctoral Fellow, McGill University  
2017-2018 Member, Institute for Advanced Study  
2016-2017 Postdoctoral Fellow, McGill University

## Education

2011-2016 Ph.D. in Mathematics, Columbia University  
Advisor: Eric Urban  
2007-2011 B.S. in Mathematics, Tsinghua University

## Awards and Grants

- National Science Foundation, No. DMS-2001527, 2020-2025

## Publications and preprints

1.  $p$ -adic  $L$ -functions for  $\mathrm{GSp}(4) \times \mathrm{GL}(2)$  II.  
arXiv:2406.05847, submitted
2.  $p$ -adic  $L$ -functions for  $\mathrm{GSp}(4) \times \mathrm{GL}(2)$ .  
arXiv:2308.08533, submitted
3. Derived  $p$ -adic heights and the leading coefficient of the Bertolini–Darmon–Prasanna  $p$ -adic  $L$ -function. (joint with Francesc Castella, Chi-Yun Hsu, Debanjana Kundu, Yu-Shen Lee)  
arXiv:2308.10474, submitted
4. Arichimedean zeta integrals for unitary groups. (joint with Ellen Eischen),  
*J. Reine Angew. Math.*, published online
5. Iwasawa–Greenberg main conjecture for non-ordinary modular forms and Eisenstein congruences on  $\mathrm{GU}(3, 1)$ . (joint with Francesc Castella and Xin Wan),  
*Forum Math. Sigma* 10: e110 1–90, 2022.

6. Ordinary families of Klingen Eisenstein series on symplectic groups.  
*Trans. Amer. Math. Soc.* 374(5):3331-3395, 2021
7. The doubling Archimedean zeta integrals for  $p$ -adic interpolation.  
*Math. Res. Lett.* 28(1):145-173, 2021
8. Differential operators and the doubling archimedean zeta integrals.  
*RIMS Kokyuroku* 2197:22-37, 2021
9. Non-cuspidal Hida theory for Siegel modular forms and trivial zeros of  $p$ -adic  $L$ -functions.  
(joint with Giovanni Rosso)  
*Math. Ann.* 378(1):153-231, 2020
10.  $p$ -adic  $L$ -functions for ordinary families on symplectic groups.  
*J. Inst. Math. Jussieu.* 19(4):1287-1347, 2020
11. Nearly overconvergent Siegel modular forms  
*Ann. Inst. Fourier (Grenoble)* 69(6):2439-2506, 2019.

### Invited Talks

Mar	2024	Columbia Automorphic Forms and Arithmetic Seminar
Oct	2023	Special session on Automorphic Forms, their Arithmetic, and their Applications at 2023 AMS sectional meeting at Creighton University
Sep	2023	Two lectures at Université Paris 13 Nord
Aug	2023	Conference on Galois Representations and Automorphic Forms, Polish Academy of Sciences Conference Center in Bedlewo
June	2023	Number Theory Seminar at Morningside Center of Mathematics, Chinese Academy of Sciences
Mar	2023	Shimura Varieties and $L$ -Functions: conference in honor of Shou-Wu Zhang on his 60th birthday, MSRI
Jan	2023	Two lectures at Introductory Workshop: Algebraic Cycles, $L$ -Values, And Euler Systems, MSRI
Dec	2022	Two lectures at Instructional workshop on Iwasawa theory for automorphic forms, Korea Institute for Advanced Study (KIAS)
Nov	2022	UT Austin Number Theory Seminar
Sep	2022	UBC Number Theory Seminar
Aug	2022	ICTS program on Elliptic curves and special values of $L$ -functions, Tata Institute
July	2022	Thematic program on $p$ -adic $L$ -functions and Eigenvarieties, University of Notre Dame
Oct	2021	Caltech Number Theory Seminar
July	2021	Oberseminar, Universidad de Duisburg-Essen
July	2021	Special Session “on Galois representations and automorphic form” at Mathematical Congress of the Americas 2021

June	2021	Special Sessions on “Algebraic number theory” and “Arithmetic Geometry” at CMS 75th+1 Anniversary Summer Meeting
Dec	2020	Seminar ”Representation Theory and Automorphic Forms”, University of Vienna
Oct	2020	Special Session on “Automorphic Forms and Galois Representations” at 2020 Fall Eastern Sectional Meeting
May	2020	UCLA Number Theory Seminar
Jan	2020	RIMS conference ”Analytic, geometric and $p$ -adic aspects of automorphic forms and $L$ -functions”, Kyoto University
Dec	2019	Colloquium, University of Oklahoma
Nov	2019	Representation and number theory seminar, University of Utah
Sep	2019	BC-MIT number theory seminar
July	2019	$p$ -adic modular forms and Galois representations, The University of Sheffield
June	2019	Iwasawa 2019, University of Bordeaux
June	2019	Eisenstein ideal and Iwasawa theory, Morningside Center of Mathematics, Chinese Academy of Sciences
May	2019	$p$ -adic Arithmetic of automorphic forms: conference in honor of Jacques Tilouine on his 60th birthday, Universities of Paris 13 and 6
Apr	2019	Algebra Seminar, University of Laval
Mar	2019	Special session on Advances in Iwasawa Theory at 2019 AMS sectional meeting at the University of Hawaii
Dec	2018	Iwasawa theory and $p$ -adic automorphic forms, Fudan University
Oct	2018	Number Theory Seminar, Johns Hopkins University
Oct	2018	Workshop on Special Values of Automorphic $L$ -functions and Associated $p$ -adic $L$ -Functions, BIRS center in Oaxaca, Mexico
Apr	2018	Algebra Seminar, University of Connecticut
Nov	2017	Junior Number Theory Days, Rutgers University
Mar	2017	Algebra and Number Theory Seminar, The University of Arizona
Jan	2017	The Québec-Vermont Number Theory Seminar, McGill University
Oct	2016	Québec-Maine Number Theory Conference, Université Laval
Mar	2015	Research Seminar In Number Theory, Columbia University

## Teaching Experience

### UCSB

2024 Winter	Math 111C: Abstract Algebra III
2024 Winter	Math 111B: Abstract Algebra II
2024 Winter	Math 220B: Modern Algebra II
2023 Fall	Math 220A: Modern Algebra I
2023 Winter	CCS Math 120PA: $p$ -adic Analysis
2023 Winter	Math 8: Transition to Higher Mathematics
2022 Fall	Math 225A: Topics in Number Theory: Class Field Theory
2022 Spring	Math 225C: Topics in Number Theory: Introduction to Automorphic Representations
2022 Winter	Math 225B: Topics in Number Theory: Modular Forms

2021 Fall            Math 231A: Lie Groups and Lie Algebras  
2021 Spring        Math 111C: Abstract Algebra III  
2021 Winter        Math 111B: Abstract Algebra II  
2020 Fall            Math 111A: Abstract Algebra I  
2020 Winter        Math 8: Transition to Higher Mathematics  
2020 Winter        Math 111B: Abstract Algebra II  
2019 Fall            Math 3B Calculus II

### **McGill**

2016 Fall            Calculus for Management

### **Columbia**

2015 Summer        Calculus II, Columbia University  
2014 Summer        College Algebra & Geometry, Columbia University

### **Professional Service**

- Co-organizer, UCSB Seminar on Geometry and Arithmetic (2019–present)
- Co-organizer, Special sessions on Automorphic forms, Galois representation, and L-functions, AMS-UMI Joint Meeting, Palermo 2024
- Project group co-leader, Collaborative Research Workshop at University of Oregon, 2022
- Study group leader for Christopher Skinner, Arizona Winter School 2018: Iwasawa Theory.