

# Gyujin Oh

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CONTACT INFORMATION	517 Mathematics, MC 4406 2990 Broadway, New York, NY 10027 <a href="https://math.columbia.edu/~gyujinoh/">https://math.columbia.edu/~gyujinoh/</a>	(609) 955-8599 <a href="mailto:gyujinoh@math.columbia.edu">gyujinoh@math.columbia.edu</a>
RESEARCH INTERESTS	Number theory, representation theory, and algebraic geometry.	
EMPLOYMENT	<b>Columbia University, New York, NY</b> J. F. Ritt Assistant Professor, 2022–. <b>Mathematical Sciences Research Institute (MSRI), Berkeley, CA</b> MSRI Postdoctoral Fellow, <i>Algebraic Cycles, L-Values, and Euler Systems</i> , Spring 2023.	
EDUCATION	<b>Princeton University</b> Ph.D. in Mathematics, 2017–2022. Advisors: Akshay Venkatesh, Christopher Skinner. Thesis: Arithmetic of Higher Coherent Cohomology of Shimura Varieties. <b>Trinity College, University of Cambridge</b> M.A.St. in Pure Mathematics (Part III), with Distinction. 2016–2017. <b>Stanford University</b> B.S. in Mathematics with Honors, Minor in Computer Science. 2010–2016. On leave 2012–2014 for the compulsory military service in South Korea.	
RESEARCH ARTICLES	<ol style="list-style-type: none"><li>7. Gyujin Oh, <i>Arithmetic quantum local systems over the moduli of curves</i>. Preprint. 2024.</li><li>6. Gyujin Oh, <i>Theta characteristics and modular forms of weight one</i>. Preprint. 2024.</li><li>5. Gyujin Oh, <i>Coherent cohomology of Shimura varieties, motivic cohomology, and archimedean L-packets</i>. Preprint. 2023.</li><li>4. Gyujin Oh, <i>Higher Koecher's principle, harmonic Hilbert Maass forms and their Borcherds lift</i>. Preprint. 2023.</li><li>3. Gyujin Oh, <i>A proof of Néron–Ogg–Shafarevich criterion via its archimedean analogue</i>. Preprint. 2023.</li><li>2. Gyujin Oh, <i>Brauer Obstructions of Finite Groups of Lie Type in View of the Local Langlands Correspondence</i>. Bachelor's Thesis, Stanford University, 2016.</li><li>1. Seok Hyeong Lee, Gyujin Oh, <i>On the distribution of cyclic number fields of prime degree</i>. <b>Int. J. Number Theory</b>, <b>08-06</b> (2012), 1463-1475.</li></ol>	
HONORS	<ul style="list-style-type: none"><li>· Centennial Fellowship, Princeton University (2017–2021).</li><li>· Trinity Studentship in Mathematics, Trinity College, Cambridge (2016–2017).</li><li>· Firestone Medal for Excellence in Undergraduate Research (2016).</li><li>· Putnam Fellow, William Lowell Putnam Competition (2016).</li><li>· Gold Medal, International Mathematical Olympiad (IMO) (2008).</li></ul>	

UNDERGRADUATE  
ADVISING

- Zhaocheng Dong, Gabriel Fernandez, Katherine Mekechuck, Xiaohua Wei.  
Columbia Math REU, Summer 2023.  
Topic: Transcendence and number theory.  
As a result of the REU, the group produced the following paper.
  - Zhaocheng Dong, Gabriel Fernandez, Katherine Mekechuck, Rafar Hajjar Munoz, and Xiaohua Wei. **A refined Siegel–Shidlovskii theorem for arithmetic Gevrey series of negative order.** 2023.
- Analisa Faulkner Valiente.  
Summer Research Initiative, Barnard College, Summer 2023.  
Topic: Sphere packing problem in dimension 8.
- Margaret Meyerson.  
Senior Thesis. 2023-24. Awarded the Departmental Honors.  
Title: Three Approaches to Transcendence Proofs: Diophantine Approximation, Algebraization, and Differential Equations.

TEACHING

- Columbia
  - Instructor for MATH UN1201 (Calculus III) in Fall 2022, Fall 2023, Fall 2024.
  - Instructor for MATH GU4043 (Algebraic Number Theory) in Spring 2024.
  - Instructor for MATH GR6657 (Graduate Algebraic Number Theory) in Spring 2025.
- Princeton
  - Instructor for MAT 104 (Calculus II) in Spring 2020.
  - Preceptor for MAT 103 (Calculus I) in Fall 2021.

EXPERIENCES

- Refereed for *Algebra and Number Theory*, *Journal of European Mathematical Society*, *Journal of Number Theory*, *Quarterly Journal of Mathematics*.
- Organized various seminars.
  - Relative Langlands duality seminar (Spring and Fall 2024, with Qiao He).
  - Automorphic Forms and Arithmetic Seminar (2023–2024, with Amadou Bah, Eric Urban).
  - Moduli of Langlands parameters (Fall 2021)
  - Princeton Junior Number Theory Tea (Spring 2020–Spring 2021)
  - Higher Hida theory (Fall 2020, with Shilin Lai)
  - Theta correspondence (Fall 2019, with Shilin Lai)
  - Deformation theory and cotangent complexes (Fall 2018, with Mohan Swaminathan)
- Republic of Korea Air Force, Sergeant (2012–2014).
- Commissioner of Team US for IMO 2020.

INVITED RESEARCH  
PRESENTATIONS

- University of Chicago, Number theory seminar, February 2025.
- MIT, Number theory seminar, December 2024.
- Ramification in geometric Langlands and non-abelian Hodge theory, Heidelberg, Germany, September 2024: *Derived structures on the arithmetic Langlands program via obstruction to geometricity* (poster).
- Arithmetic Theta Series and  $p$ -adic Modular Forms, Cetraro, Italy, June 2024: *A cohomological approach to harmonic Maass forms*.
- Princeton University, Number theory seminar, May 2024: *Derived Hecke action for weight one modular forms via classicality*.
- UCLA, Number theory seminar, April 2024: *Derived Hecke operators for weight one forms via classicality*.
- POSTECH, January 2024: Lecture series on the derived aspects of the Langlands program.
- Johns Hopkins University, Number theory seminar, October 2023: *Degenerate, Generalized, and Reduced Whittaker models*.
- AMS Eastern Sectional Meeting at SUNY Buffalo, Homological aspects of  $p$ -adic groups and automorphic representations, September 2023: *Homological aspects of Whittaker models*.
- SLMath (formerly known as MSRI), ES Program Seminar, March 2023: *On the peculiarities of weight one modular forms*.
- POSTECH, Number theory seminar, South Korea, November 2022: *A cohomological approach to harmonic Maass forms* (virtual).
- Harvard University, Number theory seminar, November 2022: *Cohomological degree-shifting operators on Shimura varieties*.
- 2022 Global KMS International Conference, October 2022: *Drinfeld level structures via prismatic Dieudonne theory* (virtual).
- UT Austin, Number theory seminar, October 2022: *Cohomological degree-shifting operators on Shimura varieties*.
- KAIST, Number theory seminar, South Korea, July 2022: *Cohomological degree-shifting actions on locally symmetric spaces*.
- QSMS Workshop, South Korea, June 2022: *Cohomological degree-shifting actions on locally symmetric spaces*.
- Seoul National University, Number theory seminar, South Korea, June 2022: *Arithmetic local systems over the moduli space of curves*.
- UCSD, Number theory seminar, May 2022: *A cohomological approach to harmonic Maass forms*.
- University of Wisconsin, Madison, Number theory seminar, May 2022: *A cohomological approach to harmonic Maass forms* (virtual).
- University of Michigan, Ann Arbor, RTG Number theory seminar, April 2022: *Degree-shifting action and  $L$ -packets*.
- Columbia University, Automorphic forms and Arithmetic seminar, March 2022: *Coherent cohomology of Shimura varieties, motivic cohomology, and  $L$ -packets*.
- Seoul National University, Number theory seminar, South Korea, January 2022: *Local cohomology of Hilbert modular varieties and harmonic Hilbert Maass forms*.
- Seoul National University, Number theory seminar, South Korea, December 2021: *Arithmetic geometry and representation theory of harmonic Maass forms*.

- London–Warwick Euler systems seminar, November 2021: *Higher Hida theory and the  $p$ -adic  $L$ -function for  $U(2, 1)$*  (virtual).
- UC Berkeley, RTG Arithmetic geometry and number theory seminar, October 2021: *Coherent cohomology of Shimura varieties, motivic cohomology and period integrals*.

INVITED CONFER-  
ENCES/WORKSHOPS

- Moduli of Higgs bundles and the Langlands program, Simons Center for Geometry and Physics, Stony Brook, July 2024
- AIM Workshop on Analytic, Arithmetic, and Geometric Aspects of Automorphic Forms, Caltech, Pasadena, CA, 2024
- Isogeny Graphs in Cryptography, BIRS, Banff, 2023
- The Arithmetic of the Langlands Program, HIM, Bonn, 2023
- Arithmetic Aspects of Deformation Theory, BIRS, Banff, 2023
- Sparsity of Algebraic Points, Summer Graduate School, MSRI, Berkeley, 2021
- Arbeitsgemeinschaft: Derived Galois Deformation Rings and Cohomology of Arithmetic Groups, Oberwolfach, Germany, 2021
- Geometric Realizations of Jacquet–Langlands Correspondences, AIM, San Jose, 2019

CITIZENSHIP

Republic of Korea (South Korea).