

Shotaro Makisumi

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Education

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| 2012–2017 | Ph.D. in Mathematics , Stanford University (expected)
Advisor: Zhiwei Yun
Thesis: Modular Koszul duality for Soergel bimodules |
| 2008–2012 | B.A. in Mathematics , Princeton University, <i>summa cum laude</i>
Advisor: Peter Sarnak
Senior thesis: A note on Riemann surfaces of large systole |

As visitor

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| Fall 2016 | Visiting graduate student, Yale University |
| Spring 2010 | Université de Nantes |

Research interests

Representation theory, with an emphasis on geometric and combinatorial/diagrammatic methods. In particular, perverse sheaves, Hecke category (parity sheaves, Braden–MacPherson moment graph sheaves, Soergel bimodules and diagrammatics), modular representations of reductive groups, knot homology.

Publications and preprints

Preprints

- [1] Modular Koszul duality for Kac–Moody groups (with Pramod Achar, Simon Riche, Geordie Williamson), in preparation.
- [2] Free-monodromic mixed tilting sheaves on flag varieties (with Pramod Achar, Simon Riche, Geordie Williamson), in preparation.
- [3] Modular Koszul duality for Soergel bimodules. 2016 preprint, preliminary version available at <http://web.stanford.edu/~makisumi/articles/koszul.pdf>
- [4] Mixed modular perverse sheaves on moment graphs. 2016 preprint, preliminary version available at <http://web.stanford.edu/~makisumi/articles/moment.pdf>

Publications from before graduate school

- [5] A note on Riemann surfaces of large systole. *J. Ramanujan Math. Soc.*, 28(3):359–377, 2013. MR3113388.
- [6] Modified Hanoi towers groups and limit spaces. *Internat. J. Algebra Comput.*, 21(6):867–887, 2011 (with G. Stadnyk and B. Steinhurst). MR2847514.

Invited talks

Upcoming research talks

- January 2017 | “Modular Koszul duality for Kac–Moody groups, part I,” AMS special session on “Representations and Related Geometry in Lie Theory,” Joint Mathematics Meetings in Atlanta, Georgia

Past research talks

- November 2016 | “A new approach to modular Koszul duality,” Algebra and Number Theory Seminar, Louisiana State University
- November 2016 | “A new approach to modular Koszul duality,” Lie Groups Seminar, Massachusetts Institute of Technology
- October 2016 | “A new approach to modular Koszul duality,” Algebra and Number Theory Seminar, Yale University
- May 2016 | “Koszul duality for Soergel bimodules,” Southeastern Lie Theory Workshop “Algebraic Groups, Quantum Groups and Geometry,” University of Virginia
- March 2016 | “Koszul duality for Soergel bimodules,” informal talk at AIM workshop “Sheaves and modular representations of reductive groups”

Expository

- November 2014 | “The Elias–Williamson proof of the Kazhdan–Lusztig conjecture,” working group on modular sheaves and modular representations, Mathematical Sciences Research Institute, Berkeley, CA

Teaching experience

At Stanford

- Winter 2016 | Math 20, Integral Calculus with Applications, Course Assistant
- Fall 2015 | Math 51, Linear Algebra and Differential Calculus of Several Variables, Teaching Assistant
- Spring 2015 | Math 51, Linear Algebra and Differential Calculus of Several Variables, Teaching Assistant
- Winter 2015 | Math 101, Math Discovery Lab, Course Assistant
- Spring 2014 | Math 155, Introduction to Analytic Number Theory, Course Assistant
- Fall 2013 | Math 51, Linear Algebra and Differential Calculus of Several Variables, Teaching Assistant
- Spring 2013 | Math 171, Fundamental Concepts of Analysis, Course Assistant
- Fall 2012 | Math 19, Single Variable Calculus, Course Assistant

Awards and honors

- 2012 | **Covington Prize**, Princeton University, Department of Mathematics awarded for excellence to 2 graduating seniors