

# Ryosuke Shimada

Department of Mathematics, the University of Hong Kong

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## Education

- Doctor, Mathematical Sciences, the University of Tokyo, April 2021-March 2024.  
Thesis: Geometric Structure of Affine Deligne-Lusztig Varieties for  $GL_n$   
Advisor: Yoichi Mieda
- Master, Mathematical Sciences, the University of Tokyo, April 2019-March 2021.  
Thesis: Geometric Structure of Affine Deligne-Lusztig Varieties for  $GL_3$   
Advisor: Yoichi Mieda
- Bachelor, Mathematics, the University of Tokyo, April 2015-March 2019.

## Academic Positions

- Visiting Scholar, UC Berkeley, April 2025-
- Assistant Professor at Hakubi Center, Kyoto University, April 2025-
- Postdoctoral Fellow, the University of Hong Kong, May 2024-present.  
Mentor: Xuhua He
- Project Researcher, the University of Tokyo, April 2024-May 2024.  
Mentor: Naoki Imai

## Research Interests

Affine Deligne-Lusztig Varieties, Shimura Varieties, Langlands program.

## Grants/Fellowships

- JSPS Overseas Research Fellowships, April 2025-March 2027.
- Basic Science Research Projects, the Sumitomo Foundation, November 2024-November 2025.
- JSPS Overseas Challenge Program for Young Researchers, August-November 2023.
- JSPS Research Fellow (DC1), Japan Society for the Promotion of Science (Grant number: JP21J22427), April 2021-March 2024.
- WINGS-FMSP Course Student, World-leading Innovative Graduate Study for Frontiers of Mathematical Sciences and Physics, October 2019-March 2024.
- Study and Visit Abroad Program (SVAP), the Faculty of Science, the University of Tokyo, January 2019-February 2019.

### Awards

- Dean's Award (Doctoral program), Graduate School of Mathematical Sciences, the University of Tokyo, March 2024.
- Dean's Award (Master's program), Graduate School of Mathematical Sciences, the University of Tokyo, March 2021.

### Scholarships

- The Julius Springer Scholarship, April 2021-March 2024.
- The Daiohs Foundation Scholarship, April 2021-March 2024.
- Dentsu Scholarship, April 2015-March 2021.

### Academic Visits

- The University of Duisburg-Essen (U. Görtz), August-November 2023.
- The Chinese University of Hong Kong (X. He), June 2023.
- The University of California, Berkeley (S. W. Shin), February 2023.
- The University of Maryland (T. Haines), November 2022.
- The Technical University of Darmstadt (T. Richarz), October 2022.
- The 2022 Summer School on the Langlands program, IHES, July 2022.
- The University of Chicago (K. Kato), January 2019-February 2019.

### Teaching/Research Assistant

- *Senior mathematics seminar*, the University of Hong Kong, 2nd Semester 2024-2025.
- TA, *Algebra I/ Exercise in Algebra I*, the University of Tokyo, Spring 2020.
- TA, *Exercise in Linear Algebra*, the University of Tokyo, Autumn 2020.
- TA, *Algebra I/ Exercise in Algebra I*, the University of Tokyo, Spring 2021.
- TA, *Introduction to Mathematical Science*, the University of Tokyo, Autumn 2021.
- TA, Mathematics Help Room, the University of Tokyo, Spring 2022.
- RA, Computer and Network Management Group, the University of Tokyo, August 2021-March 2024.

### Papers

- [1] R. Shimada, On the supersingular locus of the  $\mathrm{GU}(2, n-2)$  Shimura variety, arXiv: 2410.05110 (2024), submitted.
- [2] R. Shimada and T. Takamatsu, On the supersingular locus of the Siegel modular variety of genus 3 or 4, arXiv: 2403.19505 (2024), submitted.

- [3] R. Shimada, Basic loci of positive Coxeter type for  $GL_n$ , arXiv: 2402.13216 (2024), submitted.
- [4] F. Schremmer, R. Shimada and Q. Yu, On affine Weyl group elements of positive Coxeter type, arXiv: 2312.02630 (2023), submitted.
- [5] R. Shimada, ピンホールモデルにおける再構成問題と簾多様体, 数理科学実践研究レター2023, LMSR 2023-13.
- [6] R. Shimada, The Ekedahl-Oort stratification and the semi-module stratification, arXiv:2309.03371 (2023), to appear in *Canad. J. Math.*
- [7] R. Shimada, Semi-modules and crystal bases via affine Deligne-Lusztig varieties, *Adv. Math.* 441(2024), Paper no. 109565.
- [8] R. Shimada, On some simple geometric structure of affine Deligne-Lusztig varieties for  $GL_n$ , *Manuscripta Math.* 173(2024), no.3-4, 977-1001.
- [9] R. Shimada, Geometric structure of affine Deligne-Lusztig varieties for  $GL_3$ , *J. Algebra* 623 (2023), 86-126.

#### Invited Talks in Seminars

- [1] On the Chen-Zhu conjecture, Workshop on Affine Deligne-Lusztig varieties and Related topics, SCMS, March 6, 2025.
- [2] On the Supersingular Locus of the  $GU(2, n-2)$  Shimura Variety, Algebraic Number Theory and Related Topics 2024, RIMS, January 9, 2025.
- [3] On the Supersingular Locus of the  $GU(2, n-2)$  Shimura Variety, Workshop on arithmetic geometry, the University of Hong Kong, December 5, 2024.
- [4] On a group-theoretic approach to the supersingular locus of Shimura varieties, Theory and Applications of Supersingular Curves and Supersingular Abelian Varieties II, RIMS, November 8, 2024.
- [5] Basic loci of positive Coxeter type, the 23<sup>rd</sup> Sendai-Hiroshima Workshop on Number Theory, Tohoku University, July 9, 2024.
- [6] Beyond the cases of Coxeter type, Mathematical Society of Japan Spring Meeting 2024, Osaka Metropolitan University, March 18, 2024.
- [7] Beyond the cases of Coxeter type, Mittagsseminar zur Arithmetik, the University of Münster, November 7, 2023.
- [8] Beyond the cases of Coxeter type, Research Training Group Seminar, the University of Duisburg-Essen, October 26, 2023.
- [9] Crystal bases and affine Deligne-Lusztig varieties, the 22<sup>th</sup> Hiroshima-Sendai Workshop on Number Theory, Hiroshima University, July 14, 2023.
- [10] Crystal bases and affine Deligne-Lusztig varieties, Algebraic Lie Theory and

Representation Theory 2023, Tokyo Institute of Technology, May 14, 2023.

- [11]Semi-modules and crystal bases via affine Deligne-Lusztig varieties, the 19th Mathematics Conference for Young Researchers, Hokkaido University, March 7, 2023.
- [12]Semi-modules and crystal bases via affine Deligne-Lusztig varieties, Berkeley Number Theory Colloquium, University of California, Berkeley, February 15, 2023.
- [13]Semi-modules and crystal bases via affine Deligne-Lusztig varieties, Lie Groups and Representation Theory Seminar, the University of Maryland, November 16, 2022.
- [14]Semi-modules and crystal bases via affine Deligne-Lusztig varieties, GAUS-Seminar, Technischen Universität Darmstadt, October 20, 2022.
- [15]Semi-modules and crystal bases via affine Deligne-Lusztig varieties, Number Theory Seminar, Hokkaido University, September 21, 2022.
- [16]On some simple geometric structure of affine Deligne-Lusztig varieties for  $GL_n$ , Mathematical Society of Japan Autumn Meeting 2022, Hokkaido University, September 15, 2022.
- [17]On some simple geometric structure of affine Deligne-Lusztig varieties for  $GL_n$ , Number Theory Seminar, Kyoto University, May 27, 2022.
- [18]Geometric structure of affine Deligne-Lusztig varieties for  $GL_3$ , Mathematical Society of Japan Spring Meeting 2022, Saitama University(online), March 31, 2022.
- [19]Geometric structure of affine Deligne-Lusztig varieties, the 18th Mathematics Conference for Young Researchers, Hokkaido University (online), March 3, 2022.
- [20]Geometric structure of affine Deligne-Lusztig varieties for  $GL_3$ , the 20<sup>th</sup> Hiroshima-Sendai Workshop on Number Theory, Hiroshima University (online), July 13, 2021.
- [21]Geometric structure of affine Deligne-Lusztig varieties for  $GL_3$ , Number Theory Seminar, the University of Tokyo (online), May 26, 2021.