

Sylvester W. Zhang

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Personal Info

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Address: Vincent Hall 426, 206 Church Street SE, Minneapolis, MN 55455

Education

University of Minnesota, Twin Cities

Minneapolis, MN

Ph.D. in Mathematics (minor in Logic)

Sep 2020 - in progress

B.S. in Mathematics

Sep 2016 — May 2020

B.A. in Quantitative Economics

Sep 2016 — May 2020

Research

I work on algebraic combinatorics, and my research interest often lies in the intersection of algebra, combinatorics, geometry, and statistical physics. In particular, I enjoy building combinatorial models to describe/explain abstract phenomena arising from certain algebraic or geometric setting.

Publications

1. An Expansion Formula for Decorated Super-Teichmüller Spaces.

with G. Musiker & N. Ovenhouse.

SIGMA 17 (2021) 080. [arXiv 2102.09143](#)

2. Arborescence of Covering Graphs.

with S. Chepuri, C. Dowd, A. Hardt, G. Michel, & V. Zhang.

Algebr. Comb. Vol. 5 (2022) [arXiv 1912.01060](#)

3. Double Dimer Covers on Snake Graphs from Super Cluster Expansions.

with G. Musiker & N. Ovenhouse.

J. Algebra Vol 608 (2022) pp. 325-381. [arXiv 2107.14785](#)

4. Rowmotion Orbits of Trapezoid Posets.

with J. Wellman, Q. Dao, & C. Yost-Wolff.

Electron. J. Comb. 29-2 (2022) [arXiv 2002.04810](#)

5. Rooted Clusters for Graph LP Algebras.

with E. Banaian, S. Chepuri, & E. Kelley.

SIGMA 18 (2022), 089. [arXiv 2107.14785](#).

6. Matrix Formulae for Decorated Super Teichmüller Spaces.

with G. Musiker & N. Ovenhouse.

J. Geom. Phys. (2023) [arXiv 2208.13664](#).

7. A Lattice Model for Super LLT Polynomials.

with M. Curran, C. Frechette, C. Yost-Wolff, & V. Zhang

Comb. Theory (2023) [arXiv 2110.07597](#).

Preprints

8. Higher Dimer Covers on Snake Graphs.

	with G. Musiker, N. Ovenhouse, & R. Schiffler. arXiv 2306.14389	
Preceedings	9. Rooted Clusters for Graph LP Algebras with E. Banaian, S. Chepuri & E. Kelley proceeding of FPSAC 2022	
	10. Double Dimers and Super Ptolemy Relations with G. Musiker & N. Ovenhouse proceeding of FPSAC 2023	
In Preparation	11. Scannable Divides of Finite Mutation Type with P. Dangwal, R. Lych, S. Nguyen, & E. Pesikoff.	
	12. Snake Graphs and Positivity for Graph LP Algebras. with E. Banaian, S. Chepuri, & E. Kelley.	
Invited Talks	The Greene-Kleitman Correspondence Student Algebra and Representation Seminar, SUNY Rutgers.	November 2022
	Super Cluster Algebras from Surfaces. Combinatorics Seminar, University of Minnesota.	September 2022
	Combinatorial Formulas for Graph LP algebras. Student Combinatorics and Algebras Seminar, University of Minnesota	April 2022
	Cluster Structures from Decorated Super-Teichmüller Spaces. Workshop on supergeometry and bracket structures, Fields institute.	April 2022
	Super Cluster Algebras from Surfaces. Combinatorics Seminar, University of Minnesota.	September 2022
	Schur and LLT Polynomials from Lattice Models. Graduate Online Combinatorics Colloquium (GOCC)	March 2021
	T-paths Formula for Decorated Super-Teichmüller Spaces. Combinatorics Seminar, University of Minnesota	Feb 2021
Activities	Workshop on Supergeometry and Supermoduli Simons Center for Geometry and Physics.	April 2023
	Workshop on Symmetric Spaces. University of Ottawa.	August 2022
	The LA Workshop on Representation Theory and Geometry. University of Southern California.	June 2022
	MN Research Workshop in Algebraic Combinatorics. Co-organized at University of Minnesota.	May 2022
	Open Problems in Algebraic Combinatorics. University of Minnesota.	May 2022
	Workshop on Supergeometry and Bracket Structures. Fields Institute, University of Toronto.	March 2022

Teaching

Teaching assistant, University of Minnesota

Math 2263 (multivariable calculus): Spring 2021 Fall 2022

Math 1372 (calculus 2): Fall 2021

Math 1271 (calculus 1): Fall 2020 Spring 2021

Math 1051 (pre-calculus): Fall 2019 Spring 2020

Mentoring

PKU Algebraic Combinatorics Experience.

- Combinatorics of SL_3 cluster variables. (Mentor) Summer 2023
- Promotion orbit on trapezoid posets. (Mentor) Summer 2023

Algebra and Combinatorics REU at the University of Minnesota

- Classification for Divides of Finite Mutation Type. (TA) Summer 2022
- Minimal Matching for dP_3 cluster algebras. (TA) Summer 2022
- Kazhdan-Lusztig immanants and $\%$ -immanants. (TA) Summer 2021

Skills

Programming

Python, Mathematica, SageMath, HTML, \LaTeX . (fluent)

C++, JavaScript, Julia, R. (intermediate)

Languages

Chinese Mandarin (native), English (fluent)