# SHANA YUNSHENG LI

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## EDUCATION

**University of Illinois Urbana-Champaign** 2024 - Now
Ph.D. in Mathematics Advisor: Nathan Dunfield

**Southern University of Science and Technology** 2022 - 2024
M.Sc in Mathematics Advisor: Stavros Garoufalidis

**Southern University of Science and Technology** 2018 - 2022
B.Sc in Mathematics and Applied Mathematics with Honors

## ACADEMIC VISITS

**Simons Laufer Mathematical Sciences Institute** Jan. 2026 - Feb. 2026
Program Associate Program: Topological and Geometric Structures in Low Dimensions

## RESEARCH INTEREST

Low-dimensional Topology; Mathematical Physics; Quantum Topology; Knot Theory; Hyperbolic 3-Manifolds.

## PUBLICATIONS

3. The complete 10-tetrahedra census of orientable cusped hyperbolic 3-manifolds, to appear in Proceedings of the 42nd International Symposium on Computational Geometry (SoCG 2026), 15 pages, arXiv:2512.02142.
2. (with Stavros Garoufalidis) Patterns of the $V_2$-polynomial of knots, to appear in Experimental Mathematics, 25 pages, arXiv:2409.03557.
1. (with Ni An and Stavros Garoufalidis) Algebraic aspects of holomorphic quantum modular forms, Research in Mathematical Sciences. 11 (2024) no. 3, Paper No. 54, 1-20.

## PROJECTS

6. (with Stavros Garoufalidis and Josephine Yu) Positivity and concavity of the colored Links–Gould polynomials of knots. Drafting
5. (with Stavros Garoufalidis) The loop expansion of colored knot polynomials for Lie superalgebras. Ongoing
4. Fixed-parameter tractable computation of knot polynomials of Reshetikhin–Turaev type. Drafting
3. Extending tabulation of quasi-alternating links. Ongoing
2. Census of 12 tetrahedra oriented cusped hyperbolic 3-manifolds. Planning
1. Census of 11 tetrahedra oriented cusped hyperbolic 3-manifolds. Drafting

## THESES

**M.Sc** On the Quantum Modularity Conjecture for Knots
**B.Sc** Foundation of Supergeometry and Its Application in Mathematical Physics

## TALKS

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| **Mar. 2026** | Seminar talk at Graduate Geometry-Topology Seminar (UIUC).<br>Topic: The complete census of orientable cusped hyperbolic 3-manifolds, up to 11 tetrahedra. |
| **Feb. 2026** | Invited seminar talk at Computation in Geometric Topology, Topological and Geometric Structures in Low Dimensions, at Simons Laufer Mathematical Sciences Institute (SLMath).<br>Topic: The complete census of orientable cusped hyperbolic 3-manifolds, up to 11 tetrahedra. |
| **Nov. 2025** | Invited online talk at Australian Geometric Topology Webinar.<br>Topic: Multivariable knot polynomials, the $V_n$-polynomials, and their patterns. |
| **Oct. 2025** | Invited talk at AMS 2025 Fall Central Sectional Meeting at Saint Louis University, Special Session on Foliations and 3-manifolds.<br>Topic: The complete census of orientable cusped hyperbolic 3-manifolds, up to 10 tetrahedra. |
| **Sep. 2025** | Online talk at Equivariant Topological Quantum Field Theory workshop at Casa Mathemática Oaxaca (CMO).<br>Topic: Multivariable knot polynomials, the $V_n$-polynomials, and their patterns. |
| **Sep. 2025** | Seminar talk at Group, Geometry and Topology Seminar (UIUC).<br>Topic: Multivariable knot polynomials, the $V_n$-polynomials, and their patterns. |
| **May. 2025** | Conference talk at GTA Philadelphia 2025, 10th annual Graduate Student Conference in Algebra, Geometry, and Topology (GSCAGT) at Temple University<br>Topic: Multivariable knot polynomials, the $V_n$-polynomials, and their patterns. |
| **Apr. 2025** | Invited online talk at Shanghai Institute for Mathematics and Interdisciplinary Sciences (SIMIS).<br>Topic: Multivariable knot polynomials, the $V_n$-polynomials, and their patterns. |
| **Mar. 2025** | Seminar talk at Graduate Geometry-Topology Seminar (UIUC).<br>Topic: Multivariable knot polynomials, the $V_n$-polynomials, and their patterns. |
| **Mar. 2024** | Seminar talk at Graduate Topology Seminar (SUSTech).<br>Topic: The Teichmüller TQFT and the quantum modularity conjecture. |

## TEACHING

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| **Spring 2025** | IML graduate leader of undergraduate research project Visualizing Spaces of Curves in 3-manifolds. |
| **Autumn 2022** | Teaching assistant of MA109 (Advanced Linear Algebra). |

## AWARDS

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| **Spring 2024** | Outstanding Graduate Graduates Award<br>Outstanding Master Thesis Award |
| **Autumn 2022** | Outstanding Teaching Assistant Award |
| **Spring 2022** | Outstanding Undergraduate Graduates Award<br>Outstanding Undergraduate Thesis Award |

## OUTREACH - PIANO PERFORMANCES

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| **Autumn 2023** | "Moment · Eternity" Concert | Steinway Garden in Shenzhen Concert Hall |
| **Spring 2022** | "Youth Poetry and Music" Chamber Music Concert | Shenzhen Concert Hall |
| **Autumn 2021** | National Science & Technology University Aesthetic Education Seminar Concert | Steinway Garden in Shenzhen Concert Hall |
| **Autumn 2020** | Lang Lang's Piano Masterclass | SUSTech 10th Anniversary |
| **Autumn 2019** | Haochen Zhang's Piano Masterclass | |