

# Songhao Zhu

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## Employment

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**Georgia Institute of Technology** 2024 – Present  
Visiting Assistant Professor (Mentor: Plamen Iliev)

## Education

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**Rutgers University, New Brunswick** 2017 – 2024  
Ph. D. in Mathematics  
— Advisor: Siddhartha Sahi  
— Thesis: *Supersymmetric Shimura operators and interpolation polynomials*

**Hong Kong University of Science and Technology** August 2013 – May 2017  
Bachelor of Science in Mathematics (Pure Math Advanced)  
Minor in Physics  
— First Class Honors

## Research Interests

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Algebraic Representation Theory. Lie Algebras and Lie Superalgebras. Algebraic Combinatorics.

## Research Works

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1. *Supersymmetric Shimura operators and interpolation polynomials*, ArXiv:  
<https://arxiv.org/abs/2312.08661> (with Siddhartha Sahi)
2. *Shimura operators for certain Hermitian symmetric superpairs*, ArXiv:  
<https://arxiv.org/abs/2212.09249>
3. *Growth of root multiplicities along imaginary root strings in Kac–Moody algebras*, ArXiv:  
<https://arxiv.org/abs/2403.01687> (with Lisa Carbone, Terence Coelho, Scott H. Murray, and Forrest Thurman)
4. *A vanishing theorem for the canonical blow-ups of Grassmann manifolds*, *Complex Manifolds*, vol. 8, no. 1, 2021, pp. 415-439. (with Hanlong Fang) <https://doi.org/10.1515/coma-2020-0126>

## Invited Talks

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- *Supersymmetric Shimura operators and interpolation polynomials* Oct. 19, 2024  
2024 AMS Fall Eastern Sectional Meeting, Special Session on Interactions Between Lie Theory and Combinatorics of Symmetric Functions
- — Dec. 20, 2023  
Superalgebra Theory And Representations Seminar, joint by BGU-BIU-WIS
- *Eigenvalues of Shimura Operators for Lie Superalgebras* Mar. 10, 2023  
Lie Group/Quantum Mathematics Seminar, Rutgers University
- — Oct. 26, 2022  
School of Mathematical Sciences, Peking University

## Other Talks

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- *Let's Doodle Dynkin Diagrams! — Real Forms of Lie Algebras* Feb. 27, 2020  
Graduate Algebraic Representation Theory Seminar, Rutgers University
- *Classification and Representation Theory of Semisimple Lie Algebras* Oct. 7 & 21, 2019  
—, Rutgers University
- *An Easy Introduction to Jordan Algebras* Mar. 13, 2019  
—, Rutgers University
- *A Brief Introduction to the Representation Theory of Lie Algebras* Sept. 20, 2018  
—, Rutgers University

## Awards

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### Rutgers University

AMS Rutgers Student Chapter Award for Research Presentation	2023
School of Arts and Sciences Fellowship	2021
TA Teaching Excellence Award	2021
Academic Excellence Award	2018

### Hong Kong University of Sciences and Technology

Academic Achievement Medal	2017
S. S. Chern Class, with the Chern Class Scholarship	2016
Champion of the 4th HKUST MATH Competition (Senior Level)	2016
Champion of the 3rd HKUST MATH Competition (Junior Level)	2015
Scholarship Scheme for Continuing Undergraduate Students	2014-2017
University Scholarship of HKUST	2013-2014

## Teaching Experience

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### Georgia Institute of Technology

MATH 1551 Differential Calculus 2024 Fall, 2025 Spring

### Rutgers University

MATH 152 Calculus II 2023 Fall

MATH 250 Introduction to Linear Algebra 2020 and 2021 Summer

### *Teaching Assistant*

### Rutgers University

MATH 251 Multivariable Calculus 2023 Fall, 2023 Spring, 2021 Fall,

MATH 250 Introduction to Linear Algebra 2022 Fall, 2018 Fall

MATH 244 Differential Equations 2021 Spring, 2020 Spring, 2020 Fall

MATH 152 Calculus II 2019 Spring and Fall

MATH 403 Complex Analysis 2018 Spring

MATH 550 Graduate Linear Algebra 2017 Fall

## Services

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### Rutgers University

Organizer of the *Graduate Algebraic Representation Theory Seminar* 2021–

Organizer of the *Direct Reading Program* at Department of Mathematics 2021–

Program Coordinator of the *Rutgers Overseas Semester Experience Initiative* 2020–2021

## Other Skills

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- Languages: English (fluent); Mandarin (native); Shanghainese (native); Cantonese (conversational); French, German (reading)
- Coding: Python; Mathematica; MatLab; Maple