Songhao Zhu

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Education

Rutgers University   2017 – Present
Ph. D. in Mathematics
  — Advisor: Siddhartha Sahi
  — Thesis: *Shimura operators for certain Hermitian symmetric superpairs*

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

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

Research Works

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

- *Supersymmetric Shimura operators and interpolation polynomials*   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

- *Eigenvalues of Shimura Operators for Lie Superalgebras.*   Oct. 26, 2022
  School of Mathematical Sciences, Peking University

Other Talks

- *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

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

As Instructor
Rutgers University

MATH 152 Calculus II	2023 Fall
MATH 250 Introduction to Linear Algebra	2020 and 2021 Summer

As 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

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

- Languages: English (fluent); Mandarin (native); Shanghainese (native); Cantonese (conversational); French, German (reading)

- Coding: Python; Mathematica; MatLab; Maple