Kyungtak Hong

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RESEARCH INTERESTS

My primary research areas are representation theory and mathematical physics. In particular, my work centers on quantum (super)groups and their representations through the detailed study of their universal R-matrices and explicit isomorphisms between their various realizations. I also explore alternative quantization paradigms, such as Nichols algebras, tensor categories, Etingof-Kazhdan quantization, and categorification.

EDUCATION

Purdue University — West Lafayette, Indiana, USA
Ph.D., Mathematics — Aug. 2022 – Present (Expected Summer 2027)
Advised by Prof. Oleksandr Tsymbaliuk

Seoul National University — Seoul, Republic of Korea
Master's Coursework, Mathematical Sciences — Mar. 2019 – Jun. 2022
(Military Service: Jan. 2020 – Oct. 2021)

Seoul National University — Seoul, Republic of Korea
B.S., Mathematical Sciences & Physics — Mar. 2014 – Aug. 2018
Graduated *Summa Cum Laude*

PUBLICATIONS

1. *Rank reduction in orthosymplectic types* (with A. Tsymbaliuk). Preprint [arXiv:2610.37460], 2026.

2. *Orthosymplectic quantum groups revisited* (with A. Tsymbaliuk). *SIGMA* **22** (2026), 105, 65 pages, DOI:10.3842/SIGMA.2026.105; preprint [arXiv:2604.21785].

3. *Orthosymplectic R-matrices* (with A. Tsymbaliuk). *Lett. Math. Phys.* **116** (2026), 55, 97 pages, DOI:10.1007/s11005-026-02082-8; preprint [arXiv:2408.16720].

TALKS

Orthosymplectic Quantum Supergroups Revisited — Oct. 2026
QSMS Representation Theory Seminar, Seoul National University

Orthosymplectic Quantum Supergroups Revisited — Sep. 2026
Representation Theory Seminar, Ohio State University

Orthosymplectic Quantum Supergroups Revisited — Sep. 2026
Representation Theory Seminar, Indiana University Indianapolis

Orthosymplectic R-Matrices: Factorization and Yang-Baxterization — Aug. 2025
AMS Fall Western Sectional Meeting, University of Denver

Orthosymplectic R-Matrices: Factorization and Yang-Baxterization — Feb. 2025
Math–Physics Seminar, Purdue University

SERVICE

Referee / Reviewer 2026
International Mathematics Research Notices (IMRN)

Co-organizer, Mathematics Student Colloquium 2026 – 2027
Purdue University (weekly; with C. Agrinsoni and R. Zou)

Co-organizer, Student Geometric Representation Theory Sem. Spring 2026 – Present
Purdue University (weekly; with V. Sinha)

TEACHING & GRADING

Lecturer 2024
Purdue University
MA 16010 (Applied Calculus I)

Teaching Assistant 2022 – 2023
Purdue University
MA 26100 (Multivariate Calculus)

Grader for Graduate & Advanced Undergraduate Courses 2023 – 2026
Purdue University
Graduate Topics Courses:
MA 59500L (Lie Algebras)
MA 59500IDL (Infinite Dimensional Lie Algebras)
Graduate & Undergraduate Courses:
MA 56200 (Intro. to Differential Geometry & Topology)
MA 55400 (Linear Algebra)
MA 51000 (Vector Calculus)
MA 42500 (Complex Analysis)
MA 35100 (Elementary Linear Algebra)

Teaching Assistant 2019 – 2022
Seoul National University
Linear Algebra, Topology II, Advanced Engineering Mathematics I, Calculus I & II

CONFERENCES AND PROGRAMS ATTENDED

Quantum groups, Monoidal Categorification and Related Topics 2025
Jeju, South Korea

Combinatorics and Geometry of Moduli of Curves 2025
UIUC, Urbana-Champaign, IL

AMS Fall Western Sectional Meeting 2025
University of Denver, Denver, CO

WARTHOG: Coherent-Constructible Equivalences in Local Geometric Langlands and Representation Theory 2024
University of Oregon, Eugene, OR

Physical Mathematics of Quantum Field Theory Summer School 2023, 2024
UMass Amherst, Amherst, MA

ACMRT 2023 2023
ICTS, India (on zoom)

AGNES (Algebraic Geometry Northeastern Series) 2023
University of Pennsylvania, Philadelphia, PA

K-Theory, Algebraic Cycles and Mathematical Physics 2023
Ohio State University, Columbus, OH