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Research Interests

Representation Theory	Algebraic Groups, Cohomology, Iwahori-Hecke Algebras, q-Schur Algebras, Quantum Groups.
Combinatorics	Association Schemes, Design Theory, Graph Theory, Symbolic Dynamics, Pylogenetic Combinatorics.
Number Theory	Diophantine equations, finiteness of integral points, variable separated curves.

Employment

Jul. 2020 -	Research Scholar at Institute of Mathematics, Academia Sinica.
Oct. 2019 - Jun. 2020	Postdoc at Institute of Mathematics, Academia Sinica. Host: Ching Hung Lam

Education

Aug. 2014 - May 2019	Ph.D. in Mathematics, University of Georgia. Advisor: Daniel K. Nakano, Secondary Advisor: Chun-Ju Lai
Sep. 2010 - Jun. 2014	B.Sc. in Computer Science, Shanghai Jiao Tong University. Advisor: Yaokun Wu, Secondary Advisor: Eiichi Bannai

Publications

[1] *On q-Schur algebras corresponding to Hecke algebras of type B* (with Chun-Ju Lai and Daniel Nakano),
Transformation Groups, 2020.

[2] Chapter 4 of *Introduction to Soergel bimodules* (by Ben Elias, Shotaro Makisumi, Ulrich Thiel, Geordie Williamson),
RSME Springer Series 5, 2020.

[3] *Classification of spherical 2-distance $\{4, 2, 1\}$-designs by solving Diophantine equations* (with Eiichi Bannai, Etsuko Bannai, Wei-Hsuan Yu and Yan Zhu),
Taiwanese Journal of Mathematics, 2020.

[4] *The lit-only σ-game: some mathematics behind a puzzle for kids* (with Yaokun Wu),
The Mathematics Student, 88(3-4), 67-90, 2019.

[5] *Rational designs* (with Zhen Cui and Jiacheng Xia),
Advances in Mathematics, 352, 541-571, 2019.

[6] *Support varieties for Hecke algebras* (with Daniel Nakano),
Homology, Homotopy and Applications, 21(2), 59-82, 2019.

[7] *Nonexistence of nontrivial tight 8-designs*,
Journal of Algebraic Combinatorics, 47(2), 301-318, 2018.

[8] *Hamiltonian decomposition of prisms over cubic graphs* (with Moshe Rosenfeld),
Discrete Mathematics & Theoretical Computer Science, 16(2):111-124, 2014.

[9] *A Fisher type inequality for weighted regular t-wise balanced designs*,
Journal of Combinatorial Theory A, 119(7), 1523-1527, 2012.

Papers Submitted

The preprints are available on my personal homepage.

[10] *Explicit spherical designs*, Jul. 2018.

Preprints

[11] *Integral points on variable separated curves* (with Dino Lorenzini), Sep. 2018.

Papers in Preparation

Some abstracts are available on my personal homepage.

[12] *Majorana representation of complex vectors, Temperley-Lieb category, and two variable hypergeometric series* (with Shaoshi Chen, Mikio Nakahara, Yan Zhu).

[13] *Finiteness of tight combinatorial designs.*

[14] *New lower bound on the sizes of designs.*

[15] *Hamiltonian thickness and spanning topological minors* (with Yaokun Wu and Yinfeng Zhu).

[16] *Lit-only σ-game* (with Yaokun Wu).

[17] *Inferring phylogenies from incomplete metric information* (with Yaokun Wu, Zeying Xu and Yinfeng Zhu).

[18] *Positive matrices, primitive matrices, scrambling matrices, contractible matrices* (with Xinmao Wang and Yaokun Wu).

[19] *Fiber products of P-polynomial association schemes.*

[20] *On s-distance sets in real hyperbolic space.*

[21] *Hyperbolicity of the product graphs.*

Conference Talks

The slides are available on my personal homepage.

Nov. 8, 2020	*Finiteness of tight combinatorial designs*, Workshop on Combinatorics, Shanghai Jiao Tong University (online).
Sep. 2, 2020	*On q-Schur algebras of classical type*, 2020 Taipei Workshop on Representation Theory and Related Topics, Academia Sinica.
Jun. 28, 2020	*Graph orientations and the matrix-tree theorem*, 2π day, Shanghai Jiao Tong University (online).

Aug. 15, 2019   *Root systems over $\mathbb{F}_2$,*
                 Groups and Graphs, Designs and Dynamics,
                 Three Gorges Mathematical Research Center.

Jul. 11, 2019   *On q-Schur algebras of classical type,*
                 International Conference on Representation Theory VIII,
                 Harbin Engineering University.

May 13, 2019   *Isomorphism theorem between q-Schur algebras of classical type,*
                 Southeastern Lie Theory Workshop XI,
                 Louisiana State University.

Mar. 15, 2019   *Isomorphism theorem between q-Schur algebras of type B and type A,*
                 Spring Southeastern Sectional Meeting,
                 Auburn University.

Oct. 19, 2018   *Diophantine equations related to tight designs,*
                 Design Theory from the Viewpoint of Algebraic Combinatorics,
                 Three Gorges Mathematical Research Center.

Oct. 19, 2018   *New lower bound on the sizes of designs,*
                 Design Theory from the Viewpoint of Algebraic Combinatorics,
                 Three Gorges Mathematical Research Center.

Oct. 16, 2018   *Existence of rational designs,*
                 Design Theory from the Viewpoint of Algebraic Combinatorics,
                 Three Gorges Mathematical Research Center.

Oct. 16, 2018   *Explicit constructions of designs,*
                 Design Theory from the Viewpoint of Algebraic Combinatorics,
                 Three Gorges Mathematical Research Center.

Jun. 11, 2018   *Support varieties for Hecke algebras,*
                 Southeastern Lie Theory Workshop X, University of Georgia.

Nov. 25, 2017   *An explicit construction of spherical designs,*
                 International Workshop on Bannai-Ito Theory, Zhejiang University.

Apr. 25, 2015   *The lit-only σ-game,*
                 2015 Workshop on Combinatorics and Applications at SJTU,
                 Shanghai Jiao Tong University.

Apr. 24, 2015   *Spherical designs over a number field,*
                 2015 Workshop on Combinatorics and Applications at SJTU,
                 Shanghai Jiao Tong University.

Oct 27, 2014   *Tight block designs,*
                 Sphere Packings, Lattices, and Designs, Erwin Schrödinger International Institute.

Nov. 19, 2013   *Product of P-polynomial association schemes,*
                 Workshop on Algebraic Combinatorics, Hebei Normal University.

Jun. 24, 2013   *Lit-only σ-game,*
                 The 2nd Pacific Rim Mathematical Association Congress, Shanghai Jiao Tong University.

Nov. 21, 2012   *Some s-distance set in hyperbolic space,*
                 Mini-Workshop on Spherical Designs and Related Topics, Shanghai Jiao Tong University.

Nov. 11, 2012	*Incidence matrix and cover matrix,* The 2nd Japan-Taiwan Conference on Combinatorics and its Applications, Nagoya University.
Aug. 18, 2012	*Nonexistence of nontrivial tight 8-design,* 2012 Shanghai Conference on Algebraic Combinatorics, Shanghai Jiao Tong University.
Sep. 16, 2011	*Fisher type inequality,* Workshop on Algebraic Combinatorics, Shanghai Jiao Tong University.

Other Talks

Sep. 29, 2020	*Majorana representation of complex vectors, Temperley-Lieb category, and two variable hypergeometric series,* Colloquium, National Chiao Tung University.
Sep. 25, 2020	*Cactus skeleton: a generalization of wheels within wheels theorem,* Seminar on Combinatorics, Academia Sinica.
Sep. 18, 2020	*Solving Diophantine equations arising from algebraic combinatorics,* Seminar on Combinatorics, Academia Sinica.
Sep. 11, 2020	*A matrix-tree theorem on mixed graphs,* Seminar on Combinatorics, Academia Sinica.
Jul. 31, 2020	*Some mathematics behind the lights out game,* Seminar on Combinatorics, Academia Sinica.
Mar. 26, 2020	*On q-Schur algebras of classical types,* Colloquium, National Cheng Kung University.
Mar. 18, 2020	*An invitation to spherical designs,* Taipei Postdoc Seminar, National Center for Theoretical Sciences.
Nov. 6, 2019	*Support varieties for Iwahori-Hecke algebras,* Seminar in Representation Theory, Academia Sinica.
Jun. 21, 2019	*Support varieties for Iwahori-Hecke algebras,* Algebra Seminar, Henan University.
Apr. 1, 2019	*On q-Schur algebras of classical type,* Algebra Seminar, University at Buffalo.
Mar. 18, 2019	*Representation theory for Iwahori-Hecke algebras and Schur algebras of classical type,* Algebra Seminar, University of Georgia.
Jul. 27, 2018	*Good subsets of the unit circle,* Graduate Student Summer Conference, University of Georgia.
Feb. 5, 2018	*Support varieties for Hecke algebras,* Algebra Seminar, University of Georgia.
Nov. 6, 2017	*An introduction to Soergel bimodules,* Algebra Seminar, University of Georgia.
Jul. 26, 2017	*Dimensions of Specht modules,* Graduate Student Summer Conference, University of Georgia.
May 29, 2017	*An explicit construction of spherical designs,* Combinatorics Seminar, Shanghai Jiao Tong University.

Jul. 28, 2016   *Support varieties of Iwahori-Hecke algebras of type A*,
                 Graduate Student Summer Conference, University of Georgia.

Apr. 13, 2016   *Sphere packings, spherical codes and spherical designs*,
                 Number Theory Seminar, University of Georgia.

Jan. 28, 2015   *Nonexistence of tight 8-design*,
                 Number Theory Seminar, University of Georgia.

Jul. 9, 2014   *Structure of strongly connected digraphs*,
                 Combinatorics Seminar, Shanghai Jiao Tong University.

Apr. 12, 2014   *Laplacians*,
                 Combinatorics Seminar, Shanghai Jiao Tong University.

Jun. 13, 2013   *Relative designs, totally positive sequence and zero distribution*,
                 Combinatorics Seminar, Shanghai Jiao Tong University.

Nov. 21, 2012   *Some s-distance sets in hyperbolic space*,
                 Combinatorics Seminar, Shanghai Jiao Tong University.

Jun. 6, 2012   *On the nonexistence of nontrivial tight 8-design*,
                 Combinatorics Seminar, Shanghai Jiao Tong University.

Apr. 22, 2012   *Rational spherical t-semidesign*,
                 Combinatorics Seminar, Shanghai Jiao Tong University.

Mar. 4, 2012   *A glimpse at P-polynomial association schemes*,
                 Combinatorics Seminar, Shanghai Jiao Tong University.

Teaching

Fall 2020   Algebraic Combinatorics,
                National Center for Theoretical Sciences.

Spring 2018   Precalculus - MATH 1113 - Sections 20571,
                University of Georgia.

Fall 2017   Precalculus - MATH 1113 - Sections 15369 and 29605,
                University of Georgia.

Spring 2017   Calculus I - MATH 2250 - Section 40630,
                University of Georgia.

Fall 2016   Precalculus - MATH 1113 - Section 15218,
                University of Georgia.

Summer 2012   Computational Number Theory,
                Shanghai Jiao Tong University.

Spring 2011   Real Analysis,
                Shanghai Jiao Tong University.

Fall 2010   Calculus,
                Shanghai Jiao Tong University.

Awards and Fellowships

- William Armor Wills Memorial Scholarship, University of Georgia, Apr. 2018.

- RTG fellowship, University of Georgia, Oct. 2014 - Jul. 2016.

- Chun-Tsung Program, Shanghai Jiao Tong University, Sep. 2013 - Jun. 2014.

Service - Referee

- Applicable Analysis and Discrete Mathematics

- Ars Mathematica Contemporanea

- Advances in Mathematics

- Graphs and Combinatorics

- Journal of Pure and Applied Algebra

Conference Organization

Oct. 2018	Design Theory from the Viewpoint of Algebraic Combinatorics, Three Gorges Mathematical Research Center. *Chair, in charge of schedule and website.*
Jun. 2018	Southeast Lie Theory X, University of Georgia. *Member of the organization committee.*
Apr. 2015	2015 Workshop on Combinatorics and Applications at SJTU, Shanghai Jiao Tong University. *Chair, in charge of schedule and website.*
Apr. 2014	Minisymposium on Combinatorics, Shanghai Jiao Tong University. *Member of the organization committee.*
Nov. 2012	Mini-Workshop on Spherical Designs and Related Topics, Shanghai Jiao Tong University. *Chair, in charge of schedule and website.*
Aug. 2012	2012 Shanghai Conference on Algebraic Combinatorics, Shanghai Jiao Tong University. *Chair, in charge of badges, program book, schedule and website.*

Technical Skills

Programming languages	C, C++, Haskell, Lisp, Java, Python.
Other languages	CSS, HTML, Javascript, PHP, VHDL.
Mathematics tools	Mathematica, MATLAB, Sage.