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## Education

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

## Research Interests

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

## Employment

**Oct. 2019 -** Postdoc researcher at Institute of Mathematics, Academia Sinica.

## 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.

## Publications

- [1] *The lit-only  $\sigma$ -game: some mathematics behind a puzzle for kids* (with Yaokun Wu),  
to appear in The Mathematics Student, 88(3-4), 2019.
- [2] *Rational designs* (with Zhen Cui and Jiacheng Xia),  
Advances in Mathematics, 352, 541-571, 2019.
- [3] *Support varieties for Hecke algebras* (with Daniel Nakano),  
Homology, Homotopy and Applications, 21(2), 59-82, 2019.
- [4] *Nonexistence of nontrivial tight 8-designs*,  
Journal of Algebraic Combinatorics, 47(2), 301-318, 2018.
- [5] *Hamiltonian decomposition of prisms over cubic graphs* (with Moshe Rosenfeld),  
Discrete Mathematics & Theoretical Computer Science, 16(2):111-124, 2014.
- [6] *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.

- [7] *On  $q$ -Schur algebras corresponding to Hecke algebras of type  $B$*  (with Chun-Ju Lai and Daniel Nakano), Feb. 2019.
- [8] *Classification problem of certain spherical embeddings of strongly regular graphs* (with Eiichi Bannai, Etsuko Bannai, Wei-Hsuan Yu and Yan Zhu), Aug. 2018.
- [9] *Explicit spherical designs*, Jul. 2018.

## Preprints

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

## Papers in Preparation

Some abstracts are available on my personal homepage.

- [11] *Majorana representation of complex vectors, Temperley-Lieb category, and two variable hypergeometric series* (with Shaoshi Chen, Mikio Nakahara, Yan Zhu).
- [12] *Hamiltonian thickness and spanning topological minors* (with Yaokun Wu and Yinfeng Zhu).
- [13] *New lower bound on the sizes of designs.*
- [14] *Lit-only  $\sigma$ -game* (with Yaokun Wu).
- [15] *Inferring phylogenies from incomplete metric information* (with Yaokun Wu, Zeying Xu and Yinfeng Zhu).
- [16] *Positive matrices, primitive matrices, scrambling matrices, contractible matrices* (with Xinmao Wang and Yaokun Wu).
- [17] *Fiber products of  $P$ -polynomial association schemes.*
- [18] *On  $s$ -distance sets in real hyperbolic space.*

## Conference Talks

The slides are available on my personal homepage.

- 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  $\sigma$ -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  $\sigma$ -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

- 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

- 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.

## Service - Referee

- Applicable Analysis and Discrete Mathematics
- Advances in Mathematics
- Journal of Pure and Applied Algebra

## Conference Organization

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

## Technical Skills

*Programming languages*    C, C++, Haskell, Lisp, Java, Python.

*Other languages*            CSS, HTML, Javascript, PHP, VHDL.

*Mathematics tools*        Mathematica, MATLAB, Sage.