Weihua Liu

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Research interests: In general: Functional analysis, Probability, Quantum Theory.
In specific: Operator algebras, Free Probability Theory, Random Matrices, Quantum groups, quantum measurement and quantum information theory.

Employment:

The university of Arizona, Postdoctoral Research Associate	2019 Aug- Now
Indiana University, Zorn Postdoctoral Fellow	2016 Aug- 2019 May

Education:

University of California, Berkeley 2010-2016
Phd in Mathematics
Advisor:Dan-Virgil Voiculescu
Thesis Title: Noncommutative Distributional Symmetries and Their Related de Finetti Type Theorems

Zhejiang University 2008-2010
Master in Science
Advisor:Junde Wu
Thesis Title: On some problems of quantum measurement

Zhejiang University 2004-2008
Bachelor in Science
Advisor:Junde Wu

Publications:

1. with Junde Wu, A representation theorem of infimum of bounded quantum observables. J. Math. Phys. 49 (2008).
2. with Junde Wu, A uniqueness problem of the sequence product on operator effect algebra $\epsilon(H)$.J.Phys. A: Math. Theor. 42 (2009).
3. with Junde Wu, On fixed points of Luders operation. J. Math. Phys. 49 (2009).
4. with Junde Wu, On supremum of bounded quantum observable. J. Math. Phys. 49 (2009).
5. with Junde Wu, The fixed point sets of a class of quantum operations. J. Phys. A: Math. Theor. 43 (2010).
6. A noncommutative De Finetti theorem for boolean independence, J. Funct. Anal. 269 (2015).
7. Extended de Finetti theorems for boolean independence and monotone independence, Trans. Amer. Math. Soc. 370 (2018), no. 3, 1959-2003.
8. General de Finetti type theorems in noncommutative probability. Comm. Math. Phys. 369 (2019), no. 3, 837–866.

9. with Qiang Lei, Zhe Liu, Junde Wu, Quantum Observable Generalized Orthoalgebras arXiv:1508.07386(to appear in Positivity)
10. Free-Boolean independence for pairs of algebras. J. Funct. Anal. 277 (2019), no. 4, 994–1028.
11. with Ping Zhong, Free-Boolean independence with amalgamation, (25pages) arXiv:1712.02465 (to appear in Infin. Dimensional Anal. Quantum Probab. Relat. Top.)
12. Free-free-Boolean independence for triples of algebras.arXiv:1801.03401
13. Operator valued random matrices and asymptotic freeness, (38pages, a preliminary version) arXiv:1806.04848
14. Relations between convolutions and transforms in operator-valued free Probability,(42 pages) arXiv:1809.05789 (submitted to Advances in Mathematics).
15. with David Jekel, An Operad of Non-commutative Independences Defined by Trees, (96 pages) arXiv:1901.09158 (submitted to Dissertationes Mathematicae)
16. with Serban Belinschi, Hari Bercovici, The atoms of the free additive convolution of two operator-valued distributions, arXiv:1903.09002(a preliminary version)

Awards:

Birkhoff - von Neumann Prize by IQSA(International Quantum Structure Association) 2014
Awarded for outstanding scientific achievements in the field of quantum structures and the impact their work has on the research in quantum logic and quantum foundations.

Outstanding GSI Award 2014
Awarded for Graduate Student Instructors who have been nominated for excellence in teaching in their departments(Math department).

New World Mathematics Golden Award for the Master Thesis 2010
Awarded for outstanding Master thesis of Chinese students all over the world.
(at most one per year)

Tecent Excellence Prize in Technology and Science 2010

Teaching:

Instructor:

- Math 511: Real analysis 2018 Fall
- Math 371:Elementary Computational Methods 2017 Spring
- Math 211: Calculus I 2016 Fall, 2017 Fall, 2018 Spring & Fall
- Math 128A: Numerical Analysis 2014 Summer

Graduate Student Instructors in UC Berkeley:

- Math 128A:Numerical Analysis 2014 Fall
- Math 16B: Analytic Geometry and Calculus 2013 Fall
- Math 53:Multivariable Calculus 2012 Fall
- Math 1B: Calculus II 2012 Spring & 2013 Spring

Conference Attended and Talks:

- Quantum Structures Brussels-Gdansk Gdansk 2008
- Pseudo-Hermitian Hamiltonians in Quantum Physics IX Hangzhou, Zhejiang 2010
- Bialgebras in Free Probability Vienna, Austria 2011
- Free probability and the large N limit III Berkeley, CA 2012
- Focus Program on Noncommutative Distributions in Free Probability Theory Toronto, Ontario 2013
- Free probability and the large N limit IV Berkeley 2014
- Summer school Quantum Information and Quantum Compute in Zhejiang University Hangzhou, Zhejiang 2014
- Free Probability Concentration Week College Station, TX 2014
- Extended Probabilistic Operator Algebras Seminar Berkeley, CA 2015
- George Boole Mathematical Sciences Conference Cork, Ireland 2015
- Seminar Talk at Wuhan University Wuhan, Hubei 2015
- Zhejiang university Hangzhou, Zhejiang 2016
- Seminar Talk at TAMU University College station,TX 2016
- Free Probability and the Large N Limit V Berkeley, CA 2016
- NCGOA Spring Institute Bonn 2016
- Compact Quantum Groups Greifswald 2016
- Seminar Talk at Saarland University Saarbrücken 2016
- West Coast Operator Algebra Seminar Laramie, WY 2016
- Analytic versus Combinatorial in Free Probability Banff, Alberta, Canada 2016
- Seminar Talk at Central South University Changsha, Hunan 2017
- Seminar Talk at Harbin Institute of Technology Harbin, Heilongjiang 2017
- AMS Sectional Meetings Orlando, FL 2017
- East Coast Operator Algebra Seminar Lafayette, LA 2017
- Seminar Talk at Wuhan University Wuhan, Huber 2017
- Great Plains Operator Theory Symposium 2018 Oxford, Ohio 2018
- Seminar Talk at University of California, Berkeley Berkeley, California, 2018
- Wabash seminar Wabash, Indiana, 2019
- New Developments in free probability and applications(CRM) Montreal, Quebec 2019
- GPOTS 2018(Plenary speaker) College station, Texas 2019

Academic Service: Colloquia Co-organizer, Indiana University 2017 Fall -2018 Spring

Referee for Annales Henri Poincaré, The Journal of Mathematical Sciences, Acta Mathematica Sinica.