Huanchen Bao

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Employment

Assistant Professor, National University of Singapore, Singapore	2019 – present
Brin Postdoctoral Fellow, University of Maryland, College Park	2015 –2019
Postdoctoral Fellow, MPIM	Summer 2015 & Summer 2016 & Summer 2017
Member, Institute for Advanced Study,	2016 - 2017

Education

Ph.D. Mathematics, University of Virginia Advisor: Weiqiang Wang	2015
B.S. Mathematics, Sichuan University	2010

Research Interests

Representation theory of Lie algebras, Lie superalgebras, quantum groups, quantum symmetric pairs, and their connections to geometry and categorification; total positivity.

Grants and Awards

2020	Chevalley Prize in Lie theory (joint with Weiqiang Wang)
2018	ICCM best paper award
2015	AMS-Simons travel grant

Publications and Preprints

Publications

1. H. Bao and T. Sale, *Quantum symmetric pairs at roots of* 1, Adv. Math. **380** (2021), 107576.
2. H. Bao, W. Wang, and H. Watanabe, *Canonical bases for tensor products and super Kazhdan-Lusztig theory*, J. Pure Appl. Alg. **224** (2020), 106347.
3. H. Bao, *A categorification of Hecke algebras with parameters* 1 *and* v, J. Algebra, **538** (2019), 26–38.
4. H. Bao, P. Shan, B. Webster and W. Wang, *Categorification of quantum symmetric pairs I*, Quantum Topol. **9** (2018), 643–714.
5. H. Bao and W. Wang, *Canonical bases arising from quantum symmetric pairs*, Invent. Math. **213** (2018), 1099-1177.
6. H. Bao, J. Kujawa, Y. Li, and W. Wang, *Geometric Schur duality of classical type*, [Appendix by Bao, Li and Wang], Transform. Groups **23** (2018), 329–389.
7. H. Bao, W. Wang, and H. Watanabe, *Multiparameter quantum Schur duality of type B*, Proc. AMS **146** (2018), 3203–3216.
8. H. Bao and W. Wang, *A new approach to Kazhdan-Lusztig theory of type B via quantum symmetric pairs*, Astérisque **402**, 2018, vii+134pp.
9. H. Bao, *Kazhdan-Lusztig Theory of super type D and quantum symmetric pairs*, Represent. Theory **21** (2017), 247–276.
10. H. Bao and W. Wang, *Canonical bases in tensor products revisited*, Amer. J. Math. **138** (2016), 1731–1738.

Preprints

1. H.Bao and X. He, *A Birkhoff-Bruhat Atlas for partial flag varieties*, arXiv:2007.09873.
2. H.Bao and X. He, *Flag manifolds over semifields*, arXiv:2003.13209.
3. H. Bao and X. He, *The* $m = 2$ *amplituhedron*, arXiv:1909.06015.
4. H. Bao and W. Wang, *Canonical bases arising from quantum symmetric pairs of Kac-Moody type*, arXiv:1811.09848.
5. H.Bao, *Positivity of* $\imath$*-canonical bases*, arXiv:1809.01041.

Invited Talks

1. Algebra Seminar, University of Virginia, October 2012 & October 2013 &January 2018.
2. Algebra Seminar, Academia Sinica, Taipei, March 2013.
3. Algebra Seminar, University at Buffalo – SUNY, November 2013.
4. AMS Sectional Meeting , University of Tennessee, March 2014.
5. Southeastern Lie Theory Workshop, University of Georgia, May 2014.
6. Algebra Seminar, Sichuan University, China, July 2014.
7. Algebra Seminar, Virginia Tech, September 2014.
8. Mini-Workshop "Coideal Subalgebras of Quantum Groups", Oberwolfach, Germany, February 2015.
9. AMS Sectional Meeting, Georgetown University, March 2015.
10. Lie Groups and Representation Theory Seminar, University of Maryland, April 2015.
11. Representation Theory Seminar, Northeastern University, April 2015.
12. Taipei Conference in Representation Theory V (in honor of George Lusztig's 70^{th} birthday), Taipei, January 2016.
13. Southeastern Lie Theory Workshop: Algebraic Groups, Quantum Groups and Geometry, University of Virginia, May 2016.
14. Oberseminar, Max Planck Institute for Mathematics, Bonn , July 2016.
15. 7th international congress of Chinese Mathematicians, Beijing, August 2016.
16. AMS sectional meeting, Buffalo, September 2017.
17. Summer school and Workshop on representation theory, Shanghai, July 2018.
18. The second ICCM annual meeting, Taipei, December 2018.
19. Taipei Conference in Representation Theory VI, Taipei, January 2019.
20. Aspects of higher representation theory: quantum groups and categorification, Brussels, January 2019.
21. 2019 Young Mathematician Forum, Beijing, China, December 2019.

22. (Virtual) QRST conference, August 2020. (QRST = Quantum groups, Representation theory, Superalgebras and tensor categories)
23. (Virtual) Colloquium, CUHK, September 2020.
24. (Virtual) Conference in honor of Zhao Ke, November 2020.
25. (Virtual) The 6th KTGU Mathematics workshop for young researchers, February 2021.

Professional Services

Referee for Commun. Math. Phys., J. Lond. Math. Soc., Represent. Theory, IMRN, Selecta Math., Quarterly Journal of Mathematics.

Teaching Activities

National University of Singapore:

Algebra I (S), Fall 2019.
Graduate algebra IIB, Spring 2020.
Mathematical Analysis II, Fall 2020.
Algebra II, Spring 2021.

University of Maryland:

Introduction to categorification of quantum groups (graduate topic course), Fall 2018.
Introduction to number theory, Spring 2018.
Calculus 2, Fall 2017.
Introduction of Mathematical Proof, Spring 2016.
Calculus 3 Fall 2015.

University of Virginia:

Calculus 2 , Spring 2015.
Calculus 1, Fall 2014.
Applied Calculus 2, Spring 2012 & Spring 2014.
Applied Calculus 1, Fall 2011 & Fall 2012 & Fall 2013.

UVa Math Ambassador A math outreach program with some Albemarle County and Charlottesville city schools, Fall 2014.