

Brandon Hanson

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Citizenship

Canadian

Education

Ph.D. Mathematics. University of Toronto (under Prof. J. B. Friedlander), 2015. Thesis: *Character sum estimates in finite fields and applications*.

M.Sc. Mathematics. University of Toronto, 2010.

B.Math. Computer Mathematics, *Highest Honours*. Carleton University, 2009.

Positions

Limited Term Assistant Professor. The University of Georgia, 2018-present.

Chowla Research Fellow. The Pennsylvania State University, 2015-2018.

Visitor - Long program “Thematic Program on Unlikely Intersections, Heights, and Efficient Congruencing”. Fields Institute, January-April 2017.

Research member - Long program “Algebraic Techniques for Combinatorial and Computational Geometry”. Institute for Pure and Applied Mathematics at UCLA, March-June 2014.

Research

Fields of Research Interest

Number theory, combinatorics, harmonic analysis.

Honors, Awards, & Fellowships

AMS-Simons Travel Grant. \$4000, 2018-2019.

University of Toronto:

University of Toronto Fellowship. 2009.

NSERC CGS M. 2010.

Ontario Graduate Scholarship. 2011.

NSERC CGS D. 2012-2014.

Malcolm Slingsby Robertson Prize in Mathematics for Excellence in Thesis Research. 2015.

Carleton University:

Dean’s List. 2005 - 2009.

Entrance Scholarship. 2005 - 2009.

Richard J Semple Award. 2007 - 2009.

University Medal in Mathematics. 2009.

Publications

1. B. Hanson, *Littlewood's problem for sets of integers with multidimensional structure*. To appear in IMRN.
2. B. Hanson and G. Petridis, *Refined Estimates Concerning Sumsets Contained in the Roots of Unity*. To appear in Proc. of the London Math. Soc.
3. B. Hanson, *Long regularly-spaced and convex sequences in dense sets of integers*. Submitted.
4. B. Hanson, O. Roche-Newton and D. Zhelezov, *On iterated product sets with shifts II*. Submitted.
5. B. Hanson, O. Roche-Newton and D. Zhelezov, *On iterated product sets with shifts*. Mathematika 65 (2019), no. 4, 831-850.
6. B. Hanson, *Additive Correlation and the Inverse Problem for the Large Sieve*. Mathematical Proceedings of the Cambridge Philosophical Society, 2018.
7. B. Hanson and A. Zaman *The density of numbers represented by diagonal forms of large degree*. Mathematika 64 (2018), no. 2, 542-550.
8. B. Hanson and R.C. Vaughan *Density of Positive Diagonal Binary Quadratic Forms*. To appear in Acta Arith.
9. B. Hanson, *The Additive Structure of Cartesian Products Spanning Few Distinct Distances*. Combinatorica 38 (2018), no. 5, 1095-1100.
10. B. Hanson, R.C. Vaughan and R. Zhang, *The least number with prescribed Legendre symbols and representation by binary quadratic forms of small discriminant*. J. Number Theory 179 (2017), 3-16.
11. B. Hanson, *Estimates for character sums with various convolutions*. Acta Arith. 179 (2017), no. 2, 133-146.
12. B. Hanson, B. Lund and O. Roche-Newton, *On distinct perpendicular bisectors and pinned distances in finite fields*. Finite Fields Appl. 37 (2016), 240-264.
13. B. Hanson. *Character sums over Bohr sets*. Canad. Math. Bull. 58 (2015), no. 4, 774-786.
14. B. Hanson. *Capturing forms in dense subsets of finite fields*. Acta Arith. 160 (2013), 277-284.
15. B. Hanson, D. Panario and D. Thomson. *Swan-like results for binomials and trinomials over finite fields of odd characteristic*. Designs, Codes and Cryptography, 61(3) (2011), 273-283.

Teaching

Instructor, University of Georgia

Calculus I.

Instructor, Pennsylvania State University World Campus

Techniques of calculus.

Instructor, Pennsylvania State University

Calculus II, Calculus III, Introduction to real analysis.

Teaching Assistant, University of Toronto

Linear and abstract algebra, calculus and ordinary differential equations, real and complex analysis, number theory, combinatorics.

Seminar and Conference Talks

Regular and convex subsequences in dense sets of integers.

Second Vietnam Workshop on Graph Theory and Discrete Geometry, January 2019.

Multiplicatively structured sets, shifted.

AIM program on Additive Combinatorics, August 2018.

UGA Number Theory Seminar, September 2018.

Additive correlation and the inverse problem for the large sieve.

MIT Combinatorics Seminar, December 2017.

Penn State Algebra and Number Theory Seminar, September 2017.

The density of integers not represented by diagonal forms of large degree.

Combinatorial and Additive Number Theory (CANT), May 2017.

Towson University, May 2017.

Representation by binary quadratic Forms in short intervals.

Fields Institute, February 2017.

Sums of squares and combinatorial geometry

Conference on Analytic Number Theory, Oberwolfach, November 2016.

Interactions between combinatorial geometry and additive combinatorics

Penn State Algebra and Number Theory Seminar, September 2016.

UGA Combinatorics Seminar, September 2016.

The additive structure of squares.

Rochester Combinatorics Seminar, April 2016.

Character sums with various convolutions.

UGA Number Theory Seminar, April 2015.

Georgia Tech Combinatorics Seminar, April 2015.

PSU Number Theory Seminar, March 2015.

Winter Meeting of the Canadian Mathematical Society, Section Harmonic Analysis and Diophantine Equations, December 2015.

IPAM Reunion Conference, December 2015.

Character sums on Bohr sets - IPAM Algebraic Techniques for Combinatorial and Computational Geometry, Seminar series, June 2014.

Multiplicative character sums and the Littlewood problem - IPAM Algebraic Techniques for Combinatorial and Computational Geometry, Culminating workshop, June 2014.

Capturing forms in dense subsets of finite fields - Number Theory Satellite Session, Winter meeting of the CMS, Dec. 2012.

Miscellaneous

Spoken Languages: English, French.

Programming Languages: C, C++, Java, PHP, JavaScript, Sage.