

# Brandon Hanson

Department of Mathematics  
Penn State University  
University Park, PA 16802

Phone: (416) 899-3209  
Office: 217 McAllister  
Email: bwh5339@psu.edu  
Web: <http://personal.psu.edu/bwh5339>

## 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

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.

Chowla Fellow. Penn State University, August 2015 - present.

## Research

### *Fields of Research Interest*

Number theory, combinatorics, harmonic analysis.

### *Publications*

B.Hanson, R.C. Vaughan *Density of Positive Diagonal Binary Quadratic Forms*. In preparation.

B.Hanson, *The Additive Structure of Cartesian Products Spanning Few Distinct Distances*. Accepted for publication in *Combinatorica*.

B.Hanson, R.C. Vaughan and R. Zhang, *The least number with prescribed Legendre symbols*. Accepted for publication in *Journal of Number Theory*.

B.Hanson, *Estimates for character sums of various convolutions*. Submitted.

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.

B. Hanson. *Character sums over Bohr sets*. *Canad. Math. Bull.* 58 (2015), no. 4, 774-786.

B. Hanson. *Capturing forms in dense subsets of finite fields*. *Acta Arith.* 160 (2013), 277-284.

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, Pennsylvania State University*

Calculus with analytic geometry II, Multivariable calculus, Techniques of Calculus.

*Teaching Assistant, University of Toronto*

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

## Invited Talks

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

PSU 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.

## Honors, Awards, & Fellowships

Carleton University

Dean's List 2005 - 2009

Entrance Scholarship 2005 - 2009

Richard J Semple Award 2007 - 2009

University Medal in Mathematics - 2009

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

## Miscellaneous

*Spoken Languages:* English, French.

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