

DERRICK NORMAN HART

- CONTACT INFORMATION Hill Center - Busch Campus
Rutgers University
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- PROFESSIONAL EXPERIENCE *Hill Assistant Professor* Rutgers University
Piscataway, NJ 2008 - Present
Research and Teaching Assistant University of Missouri
Columbia, MO 2006 - 2008
VIGRE Fellow and Teaching Assistant Georgia Institute of Technology
Atlanta, GA 2003 - 2006
- EDUCATION University of Missouri Columbia, MO
Doctor of Philosophy in Mathematics 2008
Advisor: Alex Iosevich
Georgia Institute of Technology Atlanta, GA
Master of Science in Mathematics 2006
Advisor: Michael Lacey
University of Missouri Columbia, MO
Bachelor of Science in Mathematics 2002
- RESEARCH INTERESTS Additive and Geometric Combinatorics, Harmonic Analysis and Geometric Measure Theory, Analytic Number Theory
- EXTERNAL FUNDING *Expanders, Fourier analysis and point-curve incidence theory,*
National Science Foundation Grant in Combinatorics, DMS - 1001869.
Duration: June 2010–June 2013 Amount: \$107,611.
- PUBLICATIONS
- (with B. Banks, M. Sakata) *Almost all palindromes are composite*, Math. Res. Lett. **11** (2004), no. 5-6, 853–868.
 - (with A. Iosevich, J. Solymosi) *Sum-product estimates in finite fields via Kloosterman sums*, Int. Math. Res. Not. IMRN 2007, no. 5, Art. ID rnm007.
 - (with A. Iosevich) *Ubiquity of simplices in subsets of vector spaces over finite fields*, Anal. Math. **34** (2008), no. 1, 29–38.
 - (with A. Iosevich) *Sums and products in finite fields: an integral geometric viewpoint*, Contemporary Mathematics: Radon transforms, geometry, and wavelets **464** (2008).
 - (with B. Banks, P. Moree, W. Nevans) *The Nicolas and Robin inequalities with sums of two squares*, Monatsh. Math. **157** (2009), no. 4, 303–322.
 - (with A. Niziolek) *Some results on the sums and products of real numbers*. Involve, Vol. 2 (2009), No. 5, 601-607.
 - (with D. Covert, A. Iosevich, D. Koh, M. Rudnev) *Generalized incidence theorems, homogeneous forms, and sum-product estimates in finite fields*, European J. Combin. **31** (2010) 306-319.
 - (with E. Croot) *Sums and products in $\mathbb{C}[x]$* , Ramanujan J. **22** (2010), no. 1, 33–54.
- TO APPEAR
- (with A. Iosevich, D. Koh, M. Rudnev) *Averages over hyperplanes, sum-product theory in vector spaces over finite fields and the Erdos-Falconer distance conjecture*,
To appear in the Trans. Amer. Math. Soc.
 - (with E. Croot) *k-fold sums from a set with few products*,
To appear in the SIAM J. Discrete Math.

SUBMITTED WORK

11. (with A. Iosevich, D. Koh, S. Senger, I. Uriarte-Tuero) *Distance graphs in vector spaces over finite fields, coloring and pseudo-randomness.*
12. (with J. Chapman, M. B. Erdoğan, A. Iosevich, D. Koh) *Pinned distance sets, k -simplices, Wolff's exponent in finite fields and sum-product estimates.*
13. (with D. Covert, A. Iosevich, S. Senger, I. Uriarte-Tuero) *A Furstenberg-Katznelson-Weiss type theorem on $(d + 1)$ -point configurations in sets of positive density in finite field geometries.*
14. (with S. Backman, E. Croot, M. Hamel) *Sum-product inequalities with perturbation.*
15. (with L. Li, C.-Y. Shen) *Fourier analysis and expanding phenomena in finite fields.*

SERVICE
DUTIES

Rutgers University	Piscataway, NJ
Course Coordinator	Spring 2010 - Currently act as course coordinator for eleven sections of <i>Calculus I for the Mathematical and Physical Sciences</i> . Duties include assembling various course materials, maintaining the course website, and constructing the common final exam.
University of Missouri	Columbia, MO
MyMathLab Coordinator	Fall 2007 to Spring 2008 - Acted as MyMathLab coordinator for fifty sections of Intermediate and College Algebra each semester. MyMathLab is an online course aid which accompanies Pearson's textbooks in mathematics and statistics.

TEACHING
DUTIES

Rutgers University	Piscataway, NJ
Instructor	<p><i>Calculus I for the Mathematical and Physical Sciences</i> Course material includes analytic geometry, differential calculus with applications, logarithmic and exponential functions, introduction to the integral.</p> <p><i>Calculus II for the Mathematical and Physical Sciences</i> Course material included techniques of integration, elementary differential equations, sequences, infinite series, Taylor series, parametric equations, polar coordinates. Taught honors section for one semester.</p> <p><i>Elementary Differential Equations</i> Course material includes first and second order ordinary differential equations as well as systems of ordinary differential equations.</p>
Undergraduate Research	Supervised a summer undergraduate research project with Alexander Niziolek. This research culminated in a paper which was published in the journal <i>Involve</i> .
University of Missouri	Columbia, MO
Instructor	<p><i>College Algebra for Calculus Bound Students</i> Course provided a solid mathematical background for students who intended to take business calculus or calculus for the social sciences. This course relied heavily on the use of graphing calculators as a tool.</p> <p><i>Calculus for Social and Natural Sciences</i> Course material included the real number system, functions, analytic geometry, derivatives, integrals, maximum-minimum problems.</p> <p><i>Guest lecture</i> - Putnam preparation course.</p>

JOURNAL
REFEREE

Discrete Mathematics

Electronic Journal of Combinatorics

European Journal of Combinatorics

Glasgow Mathematics Journal

Online Journal of Analytic Combinatorics

Proceedings of the American Mathematical Society

SIAM Journal of Discrete Mathematics

SELECTED
INVITED
TALKS

To be determined, CMS National winter meeting - Harmonic Analysis and Additive Combinatorics, Vancouver. British Columbia (Upcoming December 2010).

Point congruences in discrete and continuous settings, Institute For Pure and Applied Mathematics - Analytical Methods in Combinatorics, Additive Number Theory and Computer Science, Los Angeles, CA (December 2009).

Sum-product theory in finite fields, Fields Institute - Workshop on Harmonic Analysis, Toronto, Ontario (February 2008).

Sums and products in finite fields, NSF FRG Conference - New Developments in Harmonic Analysis, Athens, GA (October 2007).