Nathan McNew

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Employment

Towson University

Assistant Professor — August 2015-Present
Fisher Endowed Chair in Mathematics — December 2016-June 2019

Education

Dartmouth College — Fall 2010 - Spring 2015

Ph.D. Mathematics, Advisor: Carl Pomerance — June 2015
Thesis: Multiplicative problems in combinatorial number theory

A.M. Mathematics — June 2012

University of Denver — Fall 2006 - Spring 2010

B.S. Mathematics and Physics, Summa Cum Laude, Phi Beta Kappa — June 2010

Publications

19. **Unknotted Cycles**
With C. Cornwell *Submitted for publication.*

18. **On the Erdős conjecture in function fields**
With A. Gomez-Colunga, C. Kavaler and M. Zhu. *Submitted for publication.*

17. **On the size of primitive sets in function fields**
With A. Gomez-Colunga, C. Kavaler and M. Zhu. *Finite Fields and their Applications.* **64** (2020), 101658.

16. **Counting pattern-avoiding integer partitions**
With J. Bloom. To appear in *The Ramanujan Journal.*

15. **Counting primitive sets and other statistics of the divisor graph of** $\{\mathbf{1}, \mathbf{2}, \ldots \mathbf{n}\}$
Submitted for publication.

14. **Primitive and geometric-progression-free sets without large gaps**
Acta Arithmetica. **192** (2020), 95–104.

13. **Avoiding 3-term geometric progressions in non-commutative settings**
With M. Asada, E. Fourakis, S. Manski, S. J. Miller and G. Moreland. *Submitted for publication.*

12. **When sets can and cannot have MSTD subsets**
With H. Chu, S. J. Miller, V. Xu and S. Zhang, *Journal of Integer Sequences.* **21** (2018) 18.8.2.

11. **The convex hull of the prime number graph**
In *Irregularities in the Distribution of Prime Numbers* Pintz J., Rassias M. (eds) Springer, Cham. 2018, pp. 125–141.

10. **Random multiplicative walks on the residues modulo n**
Mathematika. **63** (2017), 602–621.

9. **Ramsey theory over the integers: avoiding generalized progressions**
With A. Best, K. Huan, S. J. Miller, J. Powell, K. Tor and M. Weinstein. In *Combinatorial and Additive Number Theory II. CANT 2015, 2016.* Nathanson, M. (eds) Springer Proceedings in Mathematics & Statistics. **220**. Springer, New York, NY, 2017, pp. 39–52.

8. **Numbers divisible by a large shifted prime and large torsion subgroups of CM elliptic curves**
With P. Pollack and C. Pomerance. *International Math Reseach Notices.* **18** (2017), 5525–5553.

7. **The most frequent values of the largest prime divisor function**
Experimental Mathematics. **26** (2017), 210–224.

6. **Subsets of $\mathbb{F}_q[x]$ free of 3-term geometric progressions**
With M. Asada, E. Fourakis, S. Manski, S. J. Miller and G. Moreland. *Finite Fields and Their Applications.* **44** (2017), 135–147.

5. **Geometric-progression-free sets over quadratic number fields**
With A. Best, K. Huan, S. J. Miller, J. Powell, K. Tor and M. Weinstein. *Proceedings of the Royal Society of Edinburgh Section A.* **147** (2017), 245–262.

4. **Infinitude of k-Lehmer numbers that are not Carmichael**
With T. Wright. *International Journal of Number Theory*. **12** (2016), 1863–1869.

3. **On sets of integers which contain no three terms in geometric progression**
Mathematics of Computation. **84** (2015), 2893–2910.

2. **Efficient realization of nonzero spectra by polynomial matrices**
With N. Ormes. *Involve, A Journal of Mathematics.* **8** (2015), 1–24.

1. **Radically weakening the Carmichael and Lehmer conditions**
International Journal of Number Theory. **9** (2013), 1215–1224.

Awards and Honors and Grants

Grant to adapt OpenStax for Calculus I PI, Maryland Open Source Textbook Initiative — Fall 2018

Grant for MASON II-IV Co-PI, National Science Foundation Foundation — 2018-2020

Jess and Mildred Fisher Endowed Chair in the Mathematical and Computing Sciences
Towson University — 2016-2019

Grant for MASON I Number Theory Foundation — October 2016

Dartmouth Graduate Poster Session Winner — Spring 2015

Outstanding Graduate Student Teaching Award — April 2014
Dartmouth Center for the Advancement of Learning

NSF Graduate Student Fellowship Honorable Mention — Spring 2012

Teaching

Assistant Professor, Towson University

Math 273: Calculus I	Fall 2015, Fall 2016, Fall 2018, Fall 2020
Math 275: Calculus III	Spring 2016 ($\times 2$)
Math 314: Cryptography	Fall 2016, Spring 2017, Fall 2017, Spring 2018 ($\times 2$), Fall 2018 Spring 2019, Fall 2019 ($\times 2$), Spring 2020 ($\times 2$)
Math 315: Applied Combinatorics	Fall 2017
Math 374: Differential Equations	Spring 2020
Math 378: Experimental Mathematics	Fall 2020

Math 451: Graph Theory Spring 2018
Math 467: Algebraic Structures Fall 2015
Math 490: Senior Seminar Spring 2017
Math 465/565: Theory of Numbers Spring 2019, Fall 2019

Instructor, Dartmouth College
Math 10: Introduction to Statistics Spring 2013
Math 20: Discrete Probability Fall 2013

Co-Instructor, Dartmouth College
Math 25: Elementary Number Theory Fall 2014

Teaching Assistant, Dartmouth College
Math 8: Calculus of Functions of One and Several Variables Fall 2010
Math 13: Calculus of Vector Valued Functions Fall 2011
Math 23: Differential Equations Winter 2011, Spring 2012

Professional Activities

TU REP CURE Course professional development 3rd cohort Spring-Fall 2020
Faculty development program to discuss the design and implementation of Course-based Undergraduate Research Experience courses at TU.

SUMRY - Summer Undergraduate Math Research at Yale Summer 2019
Led group of undergraduate researchers in combinatorial number theory, resulting in two papers.

MASON II Conference April 2018
Co-organized (with Angel Kumchev) the second in the MASON series of number theory conferences.

Regional Undergraduate Math Conference April 2017, April 2018
Co-organized (with Alexei Kolesnikov, Sergei Borodachov and Seth Chart) a regional undergraduate math conference hosted at Towson for undergraduate students to present research, hear about opportunities for graduate school and network with students from nearby universities.

MASON Conference October 2016
Co-organized (with Angel Kumchev) the first in a new series of regional number theory conferences (the Mid-Atlantic Seminar On Numbers) for the Mid-Atlantic region.

Project NExT August 2016-August 2017
MAA program for new faculty to explore innovative new teaching techniques and transition from graduate school into a teaching position.

MSRI Summer School: Gaps Between Primes July 2015
A two week program with lectures and problem sessions on recent progress on gaps between primes.

Arizona winter school: Arithmetic Statistics March 2014
Workshop with lectures and problem sessions on topics in Arithmetic Statistics. I participated in the problem group for Melanie Matchett Wood's section on asymptotics for number fields and class groups.

Warwick University summer school: number theory for cryptography June 2013
Course for PhD students in number theory and related fields on cryptology. Topics included high-speed cryptography, complex multiplication of elliptic curves, discrete logarithms and integer factorization.

Dartmouth Mathematics Teaching Seminar Summer 2012
An intensive course taken by graduate students who have advanced to PhD candidacy. Involves discussion of educational philosophies, classroom techniques, and course design. Culminates in the design and instruction of two week long math camps for middle and high school students.

Banff International Research Center: Diophantine equations June 2012

A workshop on contemporary techniques in Diophantine equations including the modular approach, the Brauer-Manin obstruction, Chabauty methods, and linear forms in logarithms.

Service

MASON MidAtlantic Seminar On Numbers
- Local Co-Organizer (Towson University) — Fall 2016
- Local Co-Organizer (Towson University) — Spring 2018
- Co-Organizer (James Madison University) — Spring 2019
- Co-Organizer (Gettysburg College) — Spring 2020

Regional Undergraduate Mathematics Conference, Co-organizer 2017, 2018, Sp. 2019, Fa. 2019

Baltimore Combinatorics and Number Theory Seminar Co-organizer Fall 2015-Present

Graduate Committee-Applied and Industrial Math Program Towson U. 2016-Present

Curriculum Committee Towson University
- Assistant Chair — Fall 2019-Spring 2020

Pure Math Committee Towson University 2015-Present
- Chair — Spring 2018

Honors Program Coordinator Towson University Math Depatment 2019-Present

Department Representative to MAA Towson University 2016-Present

Colloquium Committee Towson University 2015-2018
- Chair — 2017-2018

Math Club Faculty Sponsor Towson University 2015-2019

Problem Solving Team Coach Towson University 2015-Present

Dartmouth Number Theory Seminar Organizer Fall 2011-Spring 2013

Dartmouth Graduate Student Council Math department Rep. Fall 2013-Summer 2014

Referee: 2014-Present

Journal of Number Theory, Information Security Journal, Mathematics Magazine, Mathematics of Computation, Experimental Mathematics, Integers, Mathematics, Symmetry, IEEE Access, Electronic Journal of Combinatorics

Reviewer: Mathematical Reviews 2015-Present

Educational Outreach

SUMRY (Summer Undergraduate Research at Yale) Project Mentor Summer 2019

Mentored three students through a research project regarding primitive sets of polynomials for a 10 week summer program.

Regional Undergraduate Math Research Conference April 2017, April 2018, April 2019

Co-organized conference for undergraduates in mathematics to present their research and learn about opportunities in graduate school or industry after graduation.

Williams College REU Graduate Mentor Summer 2014, 2015
Worked with undergraduates at the Williams College REU on research in combinatorial number theory.

Putnam Supervisor at Dartmouth College and Towson University 2013-Present
Helped students to prepare for the Putnam competition, and proctored the exam.

Extreme Academics, University of Denver Nov '11, Mar '13, Feb '14, Apr '15, Mar '16, Apr '17
Invited to participate in a panel discussion about applying to and doing research in grad school.

Young Mathematicians Conference, Ohio State University August 2014
Mentor to students and served on a panel discussion about applying to graduate school.

Dartmouth College Science Day April 2014
Showed visiting elementary school students about the mathematics of hexaflexagons.

Johns Hopkins Center for Talented Youth May 2011
Designed and led three workshops for middle and high school students. Topic: Cryptography

Vermont Southeast Regional MATHCOUNTS Volunteer February 2011
Gave a talk to middle school students about math research, helped proctor and grade competition.

MATHCOUNTS Coach: Jefferson Academy Middle School, Broomfield CO 2006-2010
Led weekly problem sessions with the team, discussed problem solving strategies and concepts.

Selected Presentations

Primitive sets in function fields
Combinatorial and Additive Number Theory June 2020

Counting pattern-avoiding integer partitions
PAlmetto Number Theory Series, Clemson University December 2019
Mid Atlantic Seminar On Numbers, Gettysburg College March 2020

Two combinatorial problems regarding primitive sets of integers
Combinatorics Seminar, George Washington University April 2019

Counting primitive sets and other statistics of the divisor graph of $\{1, 2, \dots n\}$
Combinatorial and Additive Number Theory, CUNY May 2018
INTEGERS, Augusta GA October 2018

Unknotted Cycles
Permutation Patterns, Dartmouth College July 2018

Primitive and geometric-progression-free sets without large gaps
Colloquium, U. of Denver April 2017
Combinatorial and Additive Number Theory, CUNY May 2017
Canadian Number Theory Association Meeting XV, Laval University July 2018
MASON, James Madison University February 2019
Colloquium, Yale University July 2019

Random multiplicative walks on the integers modulo n
Canadian Number Theory Association Meeting XIV, U. of Calgary June 2016
INTEGERS, U. of West Georgia October 2016
JMM Special Session on Analytic Number Theory, Atlanta GA January 2017

Numbers divisible by a large shifted prime
SouthEast Regional Meeting On Numbers, James Madison University April 2016
Combinatorial and Additive Number Theory, CUNY May 2016

The convex hull of the prime number graph

Combinatorial and Additive Number Theory, CUNY — May 2015
Elementary, analytic, and algorithmic number theory, U. of Georgia — June 2015
Illinois Number Theory Conference, UIUC — August 2015

Popular values of the largest prime divisor function
Combinatorial and Additive Number Theory, CUNY — May 2014
Canadian Number Theory Association Meeting XIII, Carleton College — June 2014
Quebec/Maine Number Theory Conference, Université Laval — September 2014
Department Colloquium, University of Maine — October 2014
Joint Mathematics Meetings, Austin TX — January 2015
Southeastern AMS Sectional Meeting, Huntsville, AL — April 2015
Penn State Number Theory Seminar, Penn State University — April 2016

Unconventional Results in Multiplicative Combinatorial Number Theory
Invited Graduate Speaker, SERMON, Wofford College — April 2014

Using congruences to cover the integers
Graduate Student Seminar, Dartmouth College — February 2014

Things you can prove with a degree from DU, two results in number theory
Department Colloquium, University of Denver — February 2014

On sets of integers which contain no three terms in geometric progression
Maine/Quebec Number Theory Conference, University of Maine — October 2013
INTEGERS, University of West Georgia — October 2013
West Coast Number Theory, Pacific Grove, CA — December 2013
Joint Math Meetings, Baltimore, MD — January 2014
Exciting New Faces in Analytic Number Theory,
Hausdorff Center for Mathematics, Bonn Germany — June 2014
Department Colloquium, Williams College — July 2014

When does each prime dividing $\varphi(n)$ also divide $n-1$?
Quebec/Maine Number Theory Conference, Université Laval — October 2012
Canadian Mathematics Society Winter Meeting, Montreal — December 2012

Probabilistic Galois Theory
Graduate Student Seminar, Dartmouth College — October 2011

Efficient realization of nonzero spectra by polynomial matrices
Graduate Student Seminar, Dartmouth College — October 2010
Departmental Colloquium, University of Denver — May 2010