

Nathan McNew

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Employment

Towson University

Associate Professor	2021-Present
Assistant Professor	2015-2021
Fisher Endowed Chair in Mathematics	December 2016-June 2019

Education

Dartmouth College

Ph.D. Mathematics, Advisor: Carl Pomerance	Fall 2010 - Spring 2015
<i>Thesis: Multiplicative problems in combinatorial number theory</i>	June 2015

A.M. Mathematics	June 2012
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University of Denver

B.S. Mathematics and Physics, Summa Cum Laude, Phi Beta Kappa	Fall 2006 - Spring 2010
	June 2010

Publications

24. The distribution of intermediate prime factors

With P. Pollack, A. Singha Roy. *Submitted for publication.*

23. Intermediate prime factors in specified subsets

With P. Pollack, A. Singha Roy. *Monatshefte für Mathematik.* (2023). <https://doi.org/10.1007/s00605-023-01855-w>

22. Explicit bounds for large gaps between squarefree and cubefree integers

With A. Kumchev, W. McCormick, A. Park, R. Scherr and S. Ziehr. *Submitted for publication.*

21. Permutations and the divisor graph of $[1, n]$

Mathematika. **69 (1)** (2023), 51–67. <https://doi.org/10.1112/mtk.12177>

20. Note on sets without geometric progressions

With X. Cao, J. Fang. *Integers.* **22** (2022), #A45. <http://math.colgate.edu/~integers/w45/w45.pdf>

19. Unknotted Cycles

With C. Cornwell. *The Electronic Journal of Combinatorics.* **29 (3)** (2022), #P3.509 <https://doi.org/10.37236/11016>

18. On the Erdős primitive set conjecture in function fields

With A. Gomez-Colunga, C. Kavalier and M. Zhu. *Journal of Number Theory.* **219** (2021), 412–444. <https://doi.org/10.1016/j.jnt.2020.09.001>

17. On the size of primitive sets in function fields

With A. Gomez-Colunga, C. Kavalier and M. Zhu. *Finite Fields and their Applications.* **64** (2020), 101658. <https://doi.org/10.1016/j.ffa.2020.101658>

16. Counting pattern-avoiding integer partitions

With J. Bloom. *The Ramanujan Journal.* **55** (2021) 555–591. <https://doi.org/10.1007/s11139-020-00287-6>

15. **Counting primitive sets and other statistics of the divisor graph of $\{1, 2, \dots, n\}$**
The European Journal of Combinatorics. **92** (2021) 103237.
<https://doi.org/10.1016/j.ejc.2020.103237>
14. **Primitive and geometric-progression-free sets without large gaps**
Acta Arithmetica. **192** (2020), 95–104. <https://doi.org/10.4064/aa180921-4-2>
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 Research 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

REU Grant for Towson University Math REU CO-PI, \$100,000 Award, NSA	2020
REU Grant for Towson University Math REU Key Personnel, \$300,000 Award, NSF	2022-2024
S-STEM Grant to support math majors at TU Key Personnel, \$1,000,000 Award, NSF	2021-2024
Grant to adapt OpenStax for Calculus I PI, Maryland Open Source Textbook Initiative	Fall 2018

Grant for MASON II-IV Co-PI, NSF	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 Dartmouth Center for the Advancement of Learning	April 2014

Teaching

Associate Professor, Towson University	
MATH 273: Calculus I	Fall 2021
MATH 314: Cryptography	Fall 2021, Spring 2022 ($\times 2$)
IDNM 400: Exploration of Careers in Mathematics	Fall 2021
ORIE 101: Student support for Calculus I	Fall 2021
COSC 495: Independent Study (Quantum Computing)	Spring 2022
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 ($\times 2$), Spring 2021 ($\times 2$)
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, Spring 2021
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

Visiting Scholar, University of Georgia	Fall 2022
Park City Math Institute	Summer 2022
<i>Participant in the Undergraduate Faculty Program, a 3-week long lecture and problem series. Topic: Fourier Analysis on Polytopes.</i>	
Towson REU	Summer 2022
<i>Co-mentoreed, with Angel Kumchev, a group of 4 undergraduate students investigating gaps between squarefree integers and polynomials, with three papers in preparation.</i>	

- 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 with an emphasis on inclusive teaching practices.
- SUMRY - Summer Undergraduate Math Research at Yale** Summer 2019
Led group of undergraduate researchers in combinatorial number theory, resulting in two publications.
- MASON II Conference** April 2018
Co-organized (with Angel Kumchev) the second in the MASON series of number theory conferences.
- Regional Undergraduate Math Conference**
Co-organize (with Alexei Kolesnikov, Sergei Borodachov and others) an annual 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**
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| 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 |
| Co-Organizer (Online) | Spring 2021 |
| Local Co-Organizer (Towson University) | Spring 2023 |
- Regional Undergraduate Mathematics Conference, Co-organizer** 2017, 2018, Spring 2019, Fall 2019, 2021, 2022, 2023
- 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 Math Department	
Assistant Chair		Fall 2019-Spring 2020
Pure Math Committee	Towson University Math Department	2015-Present
Chair		Spring 2018
Honors Program Coordinator	Towson University Math Department	2019-Present
Department Representative to MAA	Towson University Math Department	2016-Present
Colloquium Committee	Towson University Math Department	2015-2018, 2021-2022
Chair		2017-2018
Math Club Faculty Sponsor	Towson University Math Department	2015-2019
Problem Solving Team Coach	Towson University Math Department	2015-Present
Dartmouth Number Theory Seminar	Organizer	Fall 2011-Spring 2013
Dartmouth Graduate Student Council	Math Department Representative	Fall 2013-Summer 2014
Referee:		2014-Present
Journal of Integer Sequences, Journal of Number Theory, Information Security Journal, Mathematics Magazine, Mathematics of Computation, Experimental Mathematics, Integers, Mathematics, Symmetry, IEEE Access, Electronic Journal of Combinatorics, Involve		
Reviewer:	Mathematical Reviews	2015-Present

Educational Outreach

SUMRY (Summer Undergraduate Research at Yale) Project Mentor		Summer 2019
<i>Mentored three students through a research project regarding primitive sets of polynomials for a 10 week summer program.</i>		
Regional Undergraduate Math Research Conference	April 2017, April 2018, April 2019 November 2019, May 2021, April 2022, April 2023	
<i>Co-organized conference for undergraduates in mathematics to present their research and learn about opportunities in graduate school or industry after graduation.</i>		
Williams College REU Graduate Mentor		Summer 2014, 2015
<i>Worked with undergraduates at the Williams College REU on research in combinatorial number theory.</i>		
Putnam Supervisor at Dartmouth College and Towson University		2013-Present
<i>Helped students to prepare for the Putnam competition, and proctored the exam.</i>		
Extreme Academics, University of Denver	Nov '11, Mar '13, Feb '14, Apr '15, Mar '16, Apr '17	
<i>Invited to participate in a panel discussion about applying to and doing research in grad school.</i>		
Young Mathematicians Conference, Ohio State University		August 2014
<i>Mentor to students and served on a panel discussion about applying to graduate school.</i>		
Dartmouth College Science Day		April 2014
<i>Showed visiting elementary school students about the mathematics of hexaflexagons.</i>		
Johns Hopkins Center for Talented Youth		May 2011
<i>Designed and led three workshops for middle and high school students. Topic: Cryptography</i>		

Vermont Southeast Regional MATHCOUNTS Volunteer	February 2011
<i>Gave a talk to middle school students about math research, helped proctor and grade competition.</i>	
MATHCOUNTS Coach: Jefferson Academy Middle School, Broomfield CO	2006-2010
<i>Led weekly problem sessions with the team, discussed problem solving strategies and concepts.</i>	

Selected Presentations

The distribution of intermediate prime factors	
INTEGERS, Athens GA	May 2023
Combinatorial and Additive Number Theory, CUNY	May 2023
Permutations and the divisor graph of $[1, n]$	
Number Theory Seminar, University of Georgia	October 2022
JMM Special Session- Number Theory at non-PhD institutions, Boston MA	January 2023
Colloquium, Loyola University Baltimore	March 2023
Number Theory Seminar, Dartmouth College	May 2023
Primitive sets in function fields	
Combinatorial and Additive Number Theory (CUNY/Online)	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, University 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
