

Joshua N. Cooper

Department of Mathematics
LeConte College
1523 Greene Street, Room 317I
University of South Carolina
Columbia, SC 29208, USA

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Mathematical Research: *Quasirandomness, Spectral (Hyper)graph Theory, Combinatorial Matrix Theory, Discrete Geometry, Poset Theory, Universal Cycles, Combinatorial Number Theory, Coding Theory, Extremal Combinatorics, Computational Complexity.*

Interdisciplinary Research: *Machine Learning, Computational Biology, Computational Linguistics/NLP, Information/Coding Theory.*

Education

Ph.D. Mathematics, University of California, San Diego. *Jun 2003*
Thesis Title: Quasirandom Permutations.
Advisors: Professors Fan Chung and Ronald L. Graham.

B.S. Mathematics (Minor Linguistics), MIT, Cambridge, MA. GPA 5.0 *Dec 1998*

High School Diploma, Mass. Acad. of Math. and Sci., Worcester, MA. *May 1995*

Research Publications Accepted/Printed

53. J. Cooper, G. Fickes, Algebraic vs Geometric Nullity for Hyperpaths, *Pure Appl. Math. Q.*, to appear.
52. J. Cooper, G. Fickes, Recurrence Ranks and Moment Sequences, *Number Theory and Combinatorics. A Collection in Honor of the Mathematics of Ronald Graham*, De Gruyter, to appear.
55. R. Mitchell, J. Cooper, E. Frank, G. Holmes, Sampling Permutations for Shapley Value Estimation, *J. Machine Learning Res.*, **23** (2022), no. 43, Pages 1–46.
54. I. J. Salman, J. A. Baum, H. J. Damron, J. Y. Nelson, A. K. Smith, M. Xanthidis, J. Cooper, I. Rekleitis, Radar based navigation for Autonomous Surface Vehicles, In *Radar Perception for All-Weather Autonomy: Workshop at 2021 IEEE International Conference on Robotics and Automation (ICRA)*, 2021.
53. A. Chang, J. N. Cooper, Y. Hou, Spectral extremal results for hypergraphs, *Elec. J. Comb.* **28** (2021), no. 3, P3.46.

52. J. Cooper, G. Fickes, Recurrence Ranks and Moment Sequences, *Elec. J. Comb. Numb. Th.*, Special Issue in Memorium of Ron Graham, 21A (2021).
51. G. J. Clark, J. N. Cooper, A Harary-Sachs Theorem for Hypergraphs, *J. Comb. Th. Ser. B*, **149** (2021), Pages 1–15.
50. J. N. Cooper, Constraints on Brouwer’s Laplacian Spectrum Conjecture, *Lin. Alg. Appl.*, **615** (2021), Pages 11–27.
49. J. N. Cooper, Adjacency Spectra of Random and Complete Hypergraphs, *Lin. Alg. Appl.*, **596** (2020), no. 1, 184–202
48. G. J. Clark, J. N. Cooper, Leading Coefficients and the Multiplicity of Known Roots, *Numerical Lin. Alg. Appl.*, **27**, no. 2, (2020).
47. J. Cooper, P. Gartland, H. Whitlatch, A New Characterization of \mathcal{V} -Posets, *Order*, **37** (2020), no. 2, 371–387.
46. G. J. Clark, J. N. Cooper, Adjacency Spectral Theory for Uniform Hypergraphs, *IMAGE (Bull. Lin. Alg. Soc.)*, **62** (2019), pp. 7–19.
45. J. N. Cooper, H. W. Whitlatch, Uniquely Pressable Graphs: Characterization, Enumeration, and Recognition, *Adv. Appl. Math.*, **103** (2019), 13–42.
44. L. Elsherif, N. Sciaky, C. A. Metts, M. Modasshir, I. Rekleitis, C. A. Burris, J. A. Walker, N. Ramadan, T. M. Leisner, S. P. Holly, M. Cowles, K. I. Ataga, J. N. Cooper, L. V. Parise, Machine Learning to Quantitate Neutrophil NETosis, *Nature Scientific Reports*, Vol. 9, article number 16891 (2019).
43. G. J. Clark, J. N. Cooper, On the Adjacency Spectra of Hypertrees, *Elec. J. Comb.*, **25** (2018), no. 2, P2.48.
42. S. Butler, J. Cooper, G. Hurlbert (eds.), *Connections in Discrete Math: Celebrating the Mathematics of Ron Graham*, Cambridge University Press, 2018.
41. J. N. Cooper, B. Kay, A. Swifton, Graham’s Tree Reconstruction Conjecture and a Waring-Type Problem on Partitions, *J. Comb.*, **9** (2018), no. 3, 469–488.
40. J. N. Cooper, D. Rorabaugh, Density Dichotomy in Random Words, *Contrib. Disc. Math.*, **13** (2018), no. 1, 120–135.
39. J. N. Cooper, A. Swifton, Throwing a Ball as Far as Possible, Revisited, *Amer. Math. Monthly*, **124** (2017), no. 10, 955–959.
38. A. Chang, J. N. Cooper, W. Li, Analytic connectivity of k -uniform hypergraphs, *Linear and Multilinear Algebra*, **65** no. 6 (2017).
37. Laila Elsherif, Carrington A. Metts, Noah Sciaky, Joshua N. Cooper, Stephen P. Holly, and Leslie V. Parise, Quantitation of Suicidal Netosis Using Convolutional Neural Networks in Human Neutrophils, *Blood*, Vol. 128 **22**, 3686, 2016.
36. J. Cooper, D. Rorabaugh, Asymptotic Density of Zimin Words, *Discrete Mathematics & Theoretical Computer Science*, 18:3 (2016) #3.

35. J. N. Cooper, J. Davis, Successful Pressing Sequences for a Bicolored Graph and Binary Matrices, *Linear Alg. Appl.*, **490** no. 1 (2016), 162–173.
34. J. N. Cooper, A. Kirkpatrick, The complexity of counting poset and permutation patterns, *Australasian J. Combinatorics*, **64** no. 1 (2016).
33. J. N. Cooper, A. Dutle, Computing Hypermatrix Spectra with the Poisson Product Formula, *Linear and Multilinear Alg.*, **63** no. 5 (2015).
32. J. N. Cooper, D. Rorabaugh, Bounds on Zimin word avoidance, *Congressus Numerantium*, **222** (2014), 87–95.
31. J. Cooper, M. Filaseta, J. Harrington, D. White, Colorings of Pythagorean triples within colorings of the positive integers, *J. Comb. Number Th.*, **6** no. 1 (2014).
30. R. A. Brualdi, J. N. Cooper, Note on the Spectral Radius of Alternating Sign Matrices, *Linear Alg. Appl.*, **442** (2014), 99–105.
29. P. S. Barr, K. E. Beeler, K. S. Berenhaut, J. N. Cooper, M. N. Hunter, Deterministic Walks with Choice, *Disc. Appl. Math.*, *Discrete Appl. Math.* **162** (2014), 100–107.
28. J. N. Cooper, A. E. Kirkpatrick, Critical Sets for Sudoku and General Graphs, *Discrete Math.*, **315–316** (2014), 112–119.
27. J. N. Cooper, A. Riasanovsky, On the Reciprocal of the Binary Generating Function for the Sum of Divisors, *Journal of Integer Sequences*, **16** no. 1 (2013), Article 13.1.8.
26. J. N. Cooper, E. Lundberg, B. Nagle, Generalized Pattern Frequency in Large Permutations, *Electronic Journal of Combinatorics*, **20** no. 1 (2013), P#28.
25. J. N. Cooper, A. Dutle, Greedy Galois Games, *American Mathematical Monthly*, **120** no. 5 (2013), 441–451.
24. J. N. Cooper, C. Heitsch, Generalized Fibonacci Recurrences and the Lex-Least de Bruijn Sequence, *Advances in Applied Mathematics*, **50** no. 4 (2013), 465–473.
23. J. N. Cooper, A. Dutle, Spectra of uniform hypergraphs, *Linear Algebra Appl.* **436** no. 9 (2012), 3268—3292.
22. J. N. Cooper, J. Lenz, T. D. LeSaulnier, P. S. Wenger, D. B. West, Uniquely C_4 -Saturated Graphs, *Graphs and Combinatorics* **28** no. 2 (2012), 189–197.
21. J. N. Cooper, S. Fenner, S. Purewal, Monochromatic Boxes in Colored Grids, *SIAM Journal of Discrete Mathematics*, *SIAM J. Discrete Math.* **25** no. 3 (2011), 1054–1068.
20. J. N. Cooper, L. Lu, Graphs with Asymptotically Invariant Degree Sequences under Restriction, *Internet Mathematics*, **7**, no. 1 (2011), 67–80.
19. J. N. Cooper, R. Ellis, Linearly Bounded Liars, Adaptive Covering Codes, and Deterministic Random Walks, *J. Combinatorics* Special Issue Dedicated to Joel Spencer, **1** no. 3–4 (2010), 307–334.
18. J. N. Cooper, B. Doerr, T. Friedrich, J. Spencer, Deterministic Random Walks on Regular Trees, *Random Structures & Algorithms*, **37**, no. 3 (2010), 353–366.

17. J. N. Cooper, M. Walters, Iterated Point-Line Configurations Grow Doubly-Exponentially, *Discrete & Computational Geometry*, **43**, no. 3 (2010), 554–562.
16. J. N. Cooper, C. Heitsch, The Discrepancy of the Lex-Least de Bruijn Sequence, *Discrete Mathematics* **310** (2009), no. 6–7, 1152–1159.
15. J. N. Cooper, B. Doerr, T. Friedrich, J. Spencer, Deterministic Random Walks on Regular Trees, in S. Teng (Ed.), Proceedings of the ACM-SIAM Symposium on Discrete Algorithms (SODA 2008), San Francisco, USA, 766–772.
14. J. N. Cooper, B. Doerr, T. Friedrich, J. Spencer, Deterministic Random Walks on Regular Trees (extended abstract), *Electronic Notes in Discrete Mathematics* **29** (2007), 509–513.
13. J. N. Cooper, B. Doerr, J. Spencer, G. Tardos, Deterministic Random Walks on the Integers, *European Journal of Combinatorics*, **28** (2007), no. 8, 2072–2090.
12. J. N. Cooper, D. Eichhorn, K. O’Byrant, Reciprocals of Binary Power Series, *International Journal of Number Theory*, **2** (2006), no. 4, 499–522.
11. J. N. Cooper, B. Doerr, J. Spencer, G. Tardos, Deterministic Random Walks, *Proceedings of the Workshop on Analytic Algorithmics and Combinatorics (ANALCO 2006)*, 185–197, Philadelphia, PA, SIAM 2006.
10. J. N. Cooper, A Permutation Regularity Lemma, *Electronic J. Comb.* **13** (2006), #R22.
9. J. N. Cooper and J. Spencer, Simulating a Random Walk with Constant Error, *Combinatorics, Probability, and Computing*, **15** (2006), no. 06, 815–822.
8. J. N. Cooper, Continued Fractions with Partial Quotients Bounded in Average, *Fibonacci Quarterly* **44** (2006), no. 4, 297–301.
7. J. N. Cooper, B. Doerr, J. Spencer, G. Tardos, Deterministic Random Walks on the Integers, in S. Felsner (Ed.), European Conference on Combinatorics, Graph Theory and Applications (EuroComb) 2005, volume AE of Discrete Mathematics & Theoretical Computer Science, pages 73–76.
6. J. N. Cooper and J. Solymosi, Collinear Points in Permutations, *Ann. Comb.* **9** (2005), no. 2, 169–175.
5. J. N. Cooper, Quasirandom Arithmetic Permutations, *Journal of Number Theory* **114** (2005), no. 1, 153–169.
4. J. N. Cooper and R. L. Graham, Generalized de Bruijn Cycles, *Annals of Combinatorics* **8** (2004), no. 1, 13–25.
3. F. Chung and J. N. Cooper, De Bruijn Cycles for Covering Codes, *Random Structures and Algorithms* **25** (2004), no. 4, 421–431.
2. J. N. Cooper, Quasirandom Permutations, *Journal of Combinatorial Theory, Series A* **106** (2004), no. 1, 123–143.
1. J. N. Cooper, R. B. Ellis, A. B. Kahng, Asymmetric Binary Covering Codes, *Journal of Combinatorial Theory, Series A* **100** (2002), no. 2, 232–249.

Research Publications in Process

5. J. Cooper, G. Clark, Applications of the Harary-Sachs Theorem for Hypergraphs, submitted.
4. J. Cooper, E. Hanna, H. Whitlatch, Positive-Definite Matrices over Finite Fields, submitted.
3. J. N. Cooper, C. D. Edgar, A Development of Continuous-Time Transfer Entropy, submitted.
2. J. Cooper, M. Filaseta, K. Weatherspoon, Maximal Separable Unit Distance Graphs, in preparation.
1. J. N. Cooper, Characteristic Power Series of Graph Limits, in revision.

Non-Technical Publications

3. J. N. Cooper, Calculus Problems, *Journal of Humanistic Mathematics*, Vol. 6 **2**, 2016.
2. J. N. Cooper, Bioterrorism and the Fermi Paradox, *International Journal of Astrobiology*, Vol. 12, **02**, April 2013, 144–148
1. J. N. Cooper, A Student at the Board Meeting, *Focus* (Newsletter of the MAA), Vol. 22, **3**, March 2002.

Patents

16. J. N. Cooper, C. Yeomans, A. Riahi, M. Haddad, G. Caltabiano, US Patent #11232076, System and methods for bandwidth-efficient cryptographic data transfer, issued Jan 2022.
15. J. N. Cooper, C. Yeomans, A. Riahi, M. Haddad, G. Caltabiano, US Patent #20210232544A1, System and method for secure, fast communications between processors on complex chips, issued Jul 2021.
14. J. N. Cooper, A. Riahi, M. Haddad, R. K. Riahi, R. Riahi, C. Yeomans, WIPO Patent #2020264522A1, Data storage, transfer, synchronization, and security using recursive encoding, issued Dec 2020.
13. J. N. Cooper, C. Yeomans, A. Riahi, M. Haddad, G. Caltabiano, US Patent #20210056079A1, System and methods for bandwidth-efficient cryptographic data transfer, issued Feb 2021.
12. J. N. Cooper, A. Riahi, M. Haddad, R. K. Riahi, R. Riahi, C. Yeomans, US Patent #20210165766A1, System and method for random-access manipulation of compacted data files, issued Jun 2021.

11. J. N. Cooper, A. Riahi, M. Haddad, R. K. Riahi, R. Riahi, C. Yeomans, WIPO Patent #2020112917A1, High-speed transfer of small data sets, issued Jun 2020.
10. J. N. Cooper, C. Yeomans, A. Riahi, M. Haddad, G. Caltabiano, WIPO Patent #2021087001A1, System and methods for bandwidth-efficient cryptographic data transfer, issued May 2021.
9. J. N. Cooper, A. Riahi, M. Haddad, R. K. Riahi, R. Riahi, C. Yeomans, US Patent #US20210373776A1, System and method for data compaction and security using multiple encoding algorithms, issued Dec 2021.
8. J. N. Cooper, A. Riahi, M. Haddad, R. K. Riahi, R. Riahi, C. Yeomans, US Patent #20210232543A1, System and method for error-resilient data reduction, issued Jul 2021.
7. J. N. Cooper, A. Riahi, M. Haddad, R. K. Riahi, R. Riahi, C. Yeomans, US Patent #10706018, Bandwidth-efficient installation of software on target devices using reference code libraries, issued Jul 2020.
6. J. N. Cooper, A. Riahi, M. Haddad, R. K. Riahi, R. Riahi, C. Yeomans, US Patent #10691644, System and method for data storage, transfer, synchronization, and security using recursive encoding, issued Jun 2020.
5. J. N. Cooper, A. Riahi, M. Haddad, R. K. Riahi, R. Riahi, C. Yeomans, US Patent #10680645, System and method for data storage, transfer, synchronization, and security using codeword probability estimation, issued Jun 2020.
4. J. N. Cooper, A. Riahi, M. Haddad, R. K. Riahi, R. Riahi, C. Yeomans, US Patent #10509771, System and method for data storage, transfer, synchronization, and security using recursive encoding, issued Dec 2019.
3. J. N. Cooper, A. Riahi, M. Haddad, R. K. Riahi, R. Riahi, C. Yeomans, US Patent #10476519, System and method for high-speed transfer of small data sets, issued Nov 2019.
2. L. V. Parise, N. Sciaky, L. Elsherif, J. N. Cooper, US Patent #10303923, Quantitation of NETosis using image analysis, issued May 2019.
1. J. N. Cooper, K. A. Harry, US Patent #9916370, Systems for crowd typing by hierarchy of influence, issued March 2018.

Employment

Professor

Department of Mathematics, University of South Carolina.

Jan 2017 – Present

Visiting Professor

Department of Mathematics, University of Memphis.

Sep 2019 – Dec 2019

Associate Professor Department of Mathematics, University of South Carolina.	<i>Aug 2010 – Dec 2016</i>
Palmetto Assistant Professor Department of Mathematics, University of South Carolina.	<i>Aug 2006 – Present</i>
Post-doctoral Researcher Department of Mathematics, UCSD.	<i>Apr 2006 – Aug 2006</i>
Senior Scientist Combinatorial Structures and Algorithms Group, ETH-Zürich.	<i>Sep 2005 – Mar 2006</i>
Instructor Quasirandomness and Regularity, ETH-Zürich.	<i>Oct 2005 – Dec 2005</i>
Instructor, Vector Analysis Courant Institute of Mathematical Sciences, NYU.	<i>Jun 2005 – Aug 2005</i>
Instructor, Calculus I Courant Institute of Mathematical Sciences, NYU.	<i>Oct 2004 – Dec 2004</i>
NSF Mathematical Sciences Post-Doc. Research Fellow Courant Institute of Mathematical Sciences, NYU. <i>Sponsor:</i> Professor Joel Spencer.	<i>Sep 2003 – Aug 2005</i>
Consultant Microsoft Research (Theory Group), Redmond, WA.	<i>Sep 2003 – Dec 2003</i>
Research Associate University of Washington, Seattle, WA.	<i>Sep 2003 – Dec 2003</i>
Research Assistant University of California, San Diego. <i>Supervisor:</i> Professor Ronald L. Graham.	<i>Jun 2003 – Sep 2003</i>
Teaching Assistant University of California, San Diego. Instructor for sections in courses including Linear Algebra, Introductory Calculus, Multivariable Calculus, Algorithms, Cryptography, Financial Mathematics. Also served as grader, tutor, and occasional lecturer.	<i>Sep 1999 – Jun 2003</i>
Research Assistant University of California, San Diego. <i>Supervisor:</i> Professor Ronald L. Graham.	<i>Jun 2002 – Sep 2002</i>
Research Assistant University of California, San Diego. <i>Supervisor:</i> Professor Fan Chung Graham.	<i>Jun 2001 – Sep 2001</i>

Researcher/Programmer *Jun 2000 – Sep 2000*
DTAI, Inc. (now Kratos Defense & Security Solutions), San Diego, CA.
Application of computational geometry to spatiotemporal data storage/query, interfacing in-house software with open source code, evaluating applications of constraint logic programming to geospatial data systems. Programming in Java, XIS, PROLOG.

Quality Assurance Programmer *Jun 1999 – Sep 1999*
Curl Corporation, Cambridge, MA.
Quality Assurance testing of Curl language and development environment. Programming in Curl, C++.

Webmaster/Software Developer/Graphics Designer *Jul 1996 – Sep 1998*
Sanjeonics, Inc, South Boston, MA.
Website design/management, development of software for small business valuation and credit reporting, systems administration. Programming in TurboPascal, C++, HTML, Perl, Java, 80x86 Assembly.

Teacher *Mar 1996 – May 1998*
Combinatorics, MIT High School Studies Program (HSSP), Cambridge, MA.
Teaching basic combinatorics to high school students in ten weekly classes each Spring. Course development and student evaluation.

Conferences/Workshops Attended

(Non-speaking attendance denoted by asterisk.)

Spectral graph and hypergraph theory: connections and applications *Dec 2021*
Online (AIM / San Jose, CA).

Permutation Patterns 2021 *June 2021*
Online (Strathclyde, UK).

Combinatorial & Additive Number Theory *May 2021*
Online (New York, NY).

Birthday Conference for Steve Fenner *Jan 2021*
Online (Columbia, SC).

Conference on Graph Theory and its Applications: a Tribute to Professor Fan Chung *Dec 2019*
Tsinghua Sanya International Mathematics Forum, Sanya, Hainan, P. R. China.

* **Erdős Memorial Lecture Series** *Sep 2019*
University of Memphis, Memphis, TN.

Conference on Spectral Graph and Hypergraph Theory *Jul 2019*

Qinghai Normal University, Xining, Qinghai, P. R. China.

AMS Southeastern Sectional Meeting *Mar 2019*
Auburn University, Auburn, AL.

AMS Central Sectional Meeting *Oct 2018*
University of Michigan, Ann Arbor, MI.

* **NSF-CBMS Conf. on Additive Comb. from a Geometric Viewpoint** *May 2018*
University of South Carolina, Columbia, SC.

International Conference on Mathematics and Statistics *May 2018*
University of Memphis, Memphis, TN.

International Workshop on Spectral Hypergraph Theory *Nov 2017*
Anhui University, Hefei, P. R. China.

American Society of Hematology Annual Meeting *Nov 2016*
San Diego Convention Center, San Diego, CA.

AMS Fall Southeastern Sectional *Nov 2016*
North Carolina State University, Raleigh, NC.

SIAM Discrete Math 2016 *Jun 2016*
Georgia State University, Atlanta, GA.

* **Random Roads: A Celebration of Joel Spencer's 70th Birthday** *Apr 2016*
New York University, New York, NY.

AMS Southeastern Section Meeting *Mar 2016*
University of Georgia, Athens, GA.

* **Triangle Lectures in Combinatorics** *Feb 2016*
University of North Carolina, Greensboro, NC.

Networked Life (Chung/Graham Retirement) *Jan 2016*
University of California, San Diego, CA.

AMS Southeastern Section Meeting *Oct 2015*
University of Memphis, Memphis, TN.

International Conference on Hypergraphs and Hypernetworks *Jul 2015*
Qinghai Normal University, Xining, Qinghai, P. R. China.

Connections in Discrete Mathematics *Jun 2015*
Simon Fraser University, Burnaby, BC, Canada.

AMS Southeastern Section Meeting *Nov 2014*

University of North Carolina, Greensboro, NC.	
International Linear Algebra Society Meeting 2014 Sungkyunkwan University, Seoul, Korea.	<i>Aug 2014</i>
12th International Permutation Patterns Conference East Tennessee State University, Johnson City, TN.	<i>Jul 2014</i>
*WestFest Institute for Mathematics and its Applications, Minneapolis, MN.	<i>Jun 2014</i>
SIAM Discrete Math 2014 Hyatt Regency Minneapolis, Minneapolis, MN.	<i>Jun 2014</i>
AMS Southeastern Sectional Meeting University of Louisville, Louisville, KY.	<i>Oct 2013</i>
International Workshop of Spectral Graph and Hypergraph Theory Fuzhou University, Fuzhou, P. R. China.	<i>Jun 2013</i>
* Sentiment Analysis Symposium Lighthouse International, New York, NY.	<i>May 2013</i>
2012 International Conference on the Spectral Theory of Tensors Chern Institute, Nankai University, Tianjin, P. R. China.	<i>Jun 2012</i>
* 2012 Joint Mathematics Meeting Hynes Convention Center, Boston, MA.	<i>Jan 2012</i>
Atlanta Lecture Series in Combinatorics and Graph Theory IV Georgia State University, Atlanta, GA.	<i>Nov 2011</i>
AMS Southeastern Sectional Meeting Wake Forest University, Winston-Salem, NC.	<i>Sep 2011</i>
Random Structures & Algorithms 2011 Emory University, Atlanta, GA.	<i>May 2011</i>
SIAM-SEAS 2011 University of North Carolina at Charlotte, Charlotte, NC.	<i>Apr 2011</i>
AMS Southeastern Sectional Meeting Georgia Southern University, Statesboro, GA.	<i>Mar 2011</i>
Atlanta Lecture Series in Combinatorics and Graph Theory II Georgia State University, Atlanta, GA.	<i>Feb 2011</i>
* AMS-MAA Joint Mathematics Meeting	<i>Jan 2011</i>

New Orleans, LA.

* **Atlanta Lecture Series in Combinatorics and Graph Theory I** *Nov 2010*
Emory University, Atlanta, GA.

* **25th Mini-Conference on Discrete Mathematics and Algorithms** *Oct 2010*
Clemson University, Clemson, SC.

* **Triangle Lectures in Combinatorics** *Sep 2010*
Duke University, Durham, NC.

SIAM Conference on Discrete Mathematics *Jun 2010*
Hyatt Regency, Austin, TX.

41st Southeastern Combinatorics, Graph Theory, & Computing *Mar 2010*
Florida Atlantic University, Boca Raton, FL.

Palmetto Number Theory Series XI *Dec 2009*
University of South Carolina, Columbia, SC.

* **24th Mini-Conference on Discrete Mathematics and Algorithms** *Oct 2009*
Clemson University, Clemson, SC.

Research Experience for Graduate Students *Jul 2009*
University of Illinois, Urbana-Champaign, Urbana, IL.

* **CanADAM 2009** *May 2009*
Centre de Recherches Mathématiques, Montréal, Quebec, Canada.

SERMON 2009 *Apr 2009*
University of North Carolina, Greensboro, Greensboro, NC.

SIAM-SEAS 2009 Conference *Apr 2009*
University of South Carolina, Columbia, SC.

Ulam Centennial Conference *Mar 2009*
University of Florida, Gainesville, FL.

* **AMS-MAA Joint Mathematics Meeting #1046** *Jan 2009*
Washington, DC.

* **23th Mini-Conference on Discrete Mathematics and Algorithms** *Oct 2008*
Clemson University, Clemson, SC.

AMS Southeastern Section Meeting #1044 *Oct 2008*
University of Alabama, Huntsville, AL.

* **SIAM Conference on Discrete Mathematics** *Jun 2008*

University of Vermont, Burlington, VT.

Int. Conf. on Interdisciplinary Math. & Stat. Techniques *May 2008*
University of Memphis, Memphis, TN.

* **New Directions in Algorithms, Combinatorics, and Optimization** *May 2008*
Georgia Tech, Atlanta, GA.

* **MAA Southeastern Sectional Meeting** *Mar 2008*
The Citadel, Charleston, NC.

* **SAMSI CDI Workshop: Cyber-enabled Discovery and Innovation** *Nov 2007*
Radisson RTP, Research Triangle Park, NC.

* **22th Mini-Conference on Discrete Mathematics and Algorithms** *Oct 2007*
Clemson University, Clemson, SC.

Mini-Conference on Applied Combinatorics *Oct 2007*
University of South Carolina, Columbia, SC.

2007 AMS Fall Central Section Meeting *Oct 2007*
DePaul University, Chicago, IL.

First Joint International Meeting of the AMS and PTM *Jul-Aug 2007*
University of Warsaw, Warsaw, Poland.

Random Combinatorial Structures Conference *Apr 2007*
University of Nebraska, Lincoln, NE.

2007 AMS Spring Southeastern Section Meeting *Mar 2007*
Davidson College, Davidson, NC.

Workshop on Complex Networks and their Applications *Jan 2007*
Georgia Institute of Technology, Atlanta, GA.

2006 AMS Fall Southeastern Section Meeting *Nov 2006*
University of Arkansas, Fayetteville, AR.

DIMACS/DIMATIA/Renyi Combinatorial Challenges Meeting *Apr 2006*
Rutgers/DIMACS, Piscataway, NJ.

**Conference on Probabilistic Combinatorics & Algorithms:
A Conference in Honor of Joel Spencer's 60th Birthday** *Apr 2006*
Rutgers/DIMACS, Piscataway, NJ.

Workshop on Analytic Algorithmics & Combinatorics (ANALCO06) *Jan 2006*
Radisson Hotel Miami Downtown, Miami, FL.

Combinatorial and Additive Number Theory 2005 City University of New York, New York, NY.	<i>May 2005</i>
AMS 2005 Spring Eastern Section Meeting University of Delaware, Newark, Delaware.	<i>Apr 2005</i>
Learn & Workshop: Random Graphs and Probabilistic Methods Humboldt-Universität, Berlin, Germany.	<i>Mar 2005</i>
DOCCOURSE: Modern Ramsey Theory Prague, Czech Republic.	<i>Feb 2005</i>
* 2005 Annual AMS/MAA Joint Mathematics Conference Atlanta, GA.	<i>Jan 2005</i>
Generalizations of de Bruijn Cycles and Gray Codes BIRS, Banff, Alberta, Canada.	<i>Dec 2004</i>
DIMACS/DIMATIA/Rényi Working Group on Extremal Combinatorics II Rutgers/DIMACS, Piscataway, NJ.	<i>Oct 2004</i>
* Graph Drawing 2004 CCNY, New York, NY.	<i>Oct 2004</i>
* Mini-Workshop on Harmonic Analysis of Boolean Functions Yale University, New Haven, CT.	<i>Sep 2004</i>
SIAM Conference on Discrete Mathematics Loews Vanderbilt Plaza Hotel, Nashville, TN.	<i>Jun 2004</i>
NSF/CBMS Regional Research Conference in Mathematical Sciences on The Combinatorics of Large Sparse Graphs Cal State San Marcos, San Marcos, CA.	<i>Jun 2004</i>
* Combinatorial and Additive Number Theory 2004 CUNY Graduate Center, New York, NY.	<i>May 2004</i>
2004 CombinaTexas Texas A&M, College Station, TX.	<i>Apr 2004</i>
2003 West Coast Number Theory Conference Asilomar Conference Center, Monterey, CA.	<i>Dec 2003</i>
Integers 2003 Conference State University of West Georgia, Carrollton, GA.	<i>Nov 2003</i>
* Introductory Workshop in Discrete and Computational Geometry MSRI, Berkeley, CA.	<i>Aug 2003</i>

- * **2003 Annual AMS/MAA Joint Mathematics Conference** *Jan 2003*
Baltimore Convention Center, Baltimore, MD.
- * **West Coast Number Theory Conference** *Dec 2002*
San Francisco State University, San Francisco, CA.
- * **DIMACS Workshop on Geometric Graph Theory** *Oct 2002*
Rutgers University, Piscataway, NJ.
- SIAM Conference on Discrete Mathematics** *Aug 2002*
Handlery Hotel & Resort, San Diego, CA.
- * **NSF/CBMS Regional Research Conference in Mathematical Sciences on Geometric Graph Theory** *May 2002*
University of North Texas, Denton, TX.
- * **2002 Annual AMS/MAA Joint Mathematics Conference** *Jan 2002*
San Diego Convention Center, San Diego, CA.
- * **42nd Annual Symposium on Foundations of Computer Science** *Oct 2001*
Tropicana Hotel, Las Vegas, NV.
- 26th Annual Combinatorics, Graph Theory, and Computing** *Mar 1995*
Florida Atlantic University, Boca Raton, FL.
- * **25th Annual Combinatorics, Graph Theory, and Computing** *Mar 1994*
Florida Atlantic University, Boca Raton, FL.

Activities and Honors

- UofSC Office of Undergraduate Research (OUR) Magellan Scholarship proposal reviewer, Fall 2021.
- Senior Personnel, NSF RTG: Mathematical Foundation of Data Science at University of South Carolina, Linyuan Lu (PI), Wolfgang Dahmen, Pooyan Jamshid Dermani, Qi Wang, Wuchen Li, \$1,996,609 (notified of award).
- Skype-a-Scientist presenter, March 2020 to present.
- UofSC Discrete Mathematics Seminar YouTube channel administrator, August 2020 to present.
- AMS David P. Robbins Prize Committee member, February 2021 to January 2024.
- Co-PI (with Laila Elsherif, University of North Carolina, Chapel Hill, and Epicyper, Inc) of NIH: National Institute of Allergy and Infectious Diseases, Phase I STTR

1R41AI131840, “Quantifying NETosis Via Automated High Content Imaging Assay And Neural Networks”.

- Press interviews, featured in (among others) “Multiplication Hits the Speed Limit”, Communications of the ACM Jan 2020; “Machine learning helps scientists measure important inflammation process”, UNC Press Release, Eurekalert, Science Daily, Charlotte Post, etc, Nov-Dec 2019; “Mathematicians have found a new way to multiply two numbers together”, New Scientist, March 2019; “Mathematician Proves Huge Result on ‘Dangerous’ Problem”, Quanta Magazine, Dec 2019; three appearances for “Pi Day” on WACH-TV “Good Day Columbia” Mar 2014, 2015, 2016; one radio interview with SC Public Radio WLTR for “Pi Day”, March 2020.
- AMS Mathematical Reviews reviewer since 2017.
- Co-organizer of R. L. Graham’s 80th birthday celebration, “Connections in discrete mathematics; A celebration of the work of Ron Graham”, June 15–19 2015, Simon Fraser University, Burnaby, BC, Canada; co-editor of associated Festschrift.
- Co-organizer of 12th International Permutation Patterns Conference, July 2014, East Tennessee State University, Johnson City, TN, USA; Guest Editor of associated Special Issue of Australasian Journal of Combinatorics.
- Editorial Board member of *Involve*.
- Organizer of USC Combinatorics Seminar (Aug. 2009–May 2012, Aug 2013–Present).
- Co-organizer of Special Session on New Developments in Graph Theory at AMS South-eastern Sectional, Sep. 2011.
- Proposal reviewer for National Science Foundation (Fall ’10); National Security Agency (Fall ’10); Fonds Québécois de la Recherche sur la Nature et les Technologies (Fall ’10); National Research, Development and Innovation Office of Hungary (NKFIH, Summer ’19).
- Co-PI (with Linyuan Lu) of National Science Foundation (NSF) Division of Undergraduate Education: Course, Curriculum, and Laboratory Improvement (Type 2), “Collaborative Research: STEM Real World Applications of Mathematics” (DUE-TUES-1020692) 2010-2012.
- PI of National Science Foundation (NSF) Division of Mathematical Sciences: Algebra, Number Theory, and Combinatorics Award, “Combinatorial Quasirandomness and its Applications” (DMS-ANTC-1001370) 2010–2013.
- University of South Carolina Distinguished Undergraduate Research Mentor 2009.
- Co-organizer of Probabilistic and Extremal Combinatorics mini-symposium at SIAM–SEAS 2009.
- Invitation as Plenary Speaker at “Random Combinatorial Structures” conference, University of Nebraska, Lincoln, 4/07.
- USC Organizer for Virginia Tech Regional Mathematics Contest (VTRMC) 2010 & 2011.

- Carolina Scholar Mentor for 2008–09, 2009–10, 2010–11, 2011–12.
- Mentor for Magellan Scholar Sarah “Kaylee” Weatherspoon, Anna Kirkpatrick, Nicholas Smith, Bill Kay, and Andrew Mamroth.
- Mentor for Magellan Scholar Joshua King, awarded First Prize at poster session of USC Discovery Day ’11.
- Mentor for Magellan Scholar Chris Poirel, awarded First Prize at poster session of USC Discovery Day ’08.
- Member of the Interdisciplinary Mathematics Institute IMI–USC (9/06–Present).
- Honors College Mathematics Major Adviser (9/06–Present).
- IMI Executive Committee (9/07–12/08), USC Math Web Committee (9/06–5/12), USC Math Undergraduate Advisor (9/06–Present), USC Math Hiring Committee (9/07–5/08, 9/10–5/11), USC Math Qualifying Exam Committee (9/07–5/08), USC Math Undergraduate Advisory Council (9/08–Present), USC Faculty Senator (9/08–5/11), USC Math Event Planning Committee (9/08–Present), USC Math Grant Mentoring Committee (8/11–Present), USC Virginia Tech Regional Mathematics Contest Advisor (8/11–5/12)
- Co-organizer of the “Extremal and Probabilistic Combinatorics” AMS Special Session at the 2006 Fall Southeastern Section Meeting, Fayetteville, AR, November 3–4, 2006.
- Co-organizer of the “Probabilistic Paradigms in Combinatorics” AMS Special Session at the 2005 Spring Eastern Section Meeting, Newark, DE, April 2–3, 2005.
- Two months invited visit to the Rényi Institute, Budapest, Feb 2005–Mar 2005.
- Second-place winner (with Reid Andersen and Robert Ellis) of Graph Drawing Contest at the 2004 Graph Drawing Conference in New York, NY.
- Recipient of National Science Foundation (NSF) Mathematical Sciences Postdoctoral Research Fellowship (MSPRF-0303272) 2003–2006 to study at New York University (NYU) with Professor Joel Spencer.
- Graduate Assistance in Areas of National Need (GAANN) Fellow, 2001.
- Co-organizer of the Combinatorial Structures from Discrete Geometry Mini-Symposium at the August 2002 SIAM Conference on Discrete Mathematics, San Diego, CA.
- Referee for Elec. J. Comb., Comp. Geom.: Theory and Appl., J. Comb. Theory Series A, SIAM J. Comp., SIAM J. Disc. Math., J. Integer Sequences, Math. Research Letters, Ars Combinatoria, Combinatorica, J. Design Theory, Discrete Math., Discrete Appl. Math., Ann. Comb., J. Comb., Networks, American Math. Monthly, Random Structures & Alg., Graphs & Comb., Integers, Disc. & Comp. Geom., Comb. Prob. & Comp., Inf. Proc. Letters, Appl. Anal. & Disc. Math., Linear Alg. & Appl., Phys. Letters A, STOC, SODA, ALENEX, LAGOS, STACS.
- Invited Representative for Graduate Students to January 2002 Mathematical Association of America Board of Governors Meeting, San Diego, CA.

- Administrator of MathStorm, a student-run mathematics consulting service for researchers at UCSD.
- Recipient of National Merit Scholarship Award, 1995.

Presentations

• Invited Long Form

Homogeneous Eigenvalues of Hypergraphs and their Associated Eigenvarieties
Spectral graph and hypergraph theory (remote), AIM, San Jose, CA. *Dec 2021*

Around the Brouwer Conjecture *Nov 2020*
Discrete Mathematics Seminar (remote), University of Delaware, Newark, DE.

The Mathematics of Sudoku *Sep 2020*
TMWYF Seminar (remote), University of South Alabama, Mobile, AL.

Characteristic Power Series of Graph Limits *Nov 2019*
Math Dept Colloquium, University of Memphis, Memphis, TN.

Characteristic Power Series of Graph Limits *Jul 2019*
Combinatorics Seminar, Fuzhou University, Fuzhou, Fujian, P. R. China.

Characteristic Power Series of Graph Limits *Jul 2019*
Conference on Spectral Graph and Hypergraph Theory, Qinghai Normal University, Xining, Qinghai, P. R. China.

A Generalization of the Harary-Sachs Theorem to Hypergraphs *Sep 2018*
Combinatorics Seminar, Georgia Institute of Technology, Atlanta, GA.

Graph Pressing Sequences and Binary Linear Algebra *May 2018*
ICOMAS 2018 (Plenary Address), University of Memphis, Memphis, TN.

Graph Pressing Sequences and Binary Linear Algebra *Mar 2018*
Discrete Mathematics Seminar, Iowa State University, Ames, IA.

Adjacency Spectra of Hypertrees and other Hypergraphs with Few Eigenvalues
Nov 2017
2017 International Workshop on Spectral Hypergraph Theory, Hefei, Anhui, P. R. China.

Graph Pressing Sequences and Binary Linear Algebra *Oct 2017*
Illinois Institute of Technology Department of Mathematics Colloquium, Chicago, IL.

Graph Pressing Sequences and Binary Linear Algebra *Oct 2017*
UIC Department of Mathematics MCS Seminar, Chicago, IL.

- Using Machine Learning to Study NETs and NETosis** *Oct 2017*
UNC Department of Hematology/Oncology Seminar Series, Chapel Hill, NC.
- MAMS Alumni Presentation: Computer Science Week** *Dec 2016*
Massachusetts Academy of Mathematics and Science, Worcester, MA.
- SCGSSM Presentation: SmartChat Speaker Series** *Mar 2016*
SC Governor's School for Science and Math, Hartsville, SC.
- MAMS Alumni Presentation: Computer Science Week** *Dec 2015*
Massachusetts Academy of Mathematics and Science, Worcester, MA.
- Spectra of random hypergraphs and hypermatrices** *Oct 2015*
AMS Southeastern Sectional Meeting, Memphis, TN.
- Spectra of random hypergraphs and hypermatrices** *Jul 2015*
International Conference on Hypergraphs and Hypernetworks, Xining, Qinghai, P. R. China.
- Pressing sequences, bicolored graphs, and binary matrix algebra** *Jun 2015*
Connections in Discrete Mathematics, Burnaby, BC, Canada.
- The complexity of counting poset and permutation patterns** *Dec 2014*
ADM Seminar, Clemson University, Clemson, SC.
- Computer "proofs": Are they rigorous?** *Oct 2014*
Math for Everyone Lecture Series, Notre Dame, South Bend, IN.
- Homogeneous Adjacency Spectra of Random Hypergraphs** *Feb 2014*
Probability Seminar, Cornell University, Ithaca, NY.
- Homogeneous Adjacency Spectra of Random and Complete Hypergraphs** *Feb 2014*
Combinatorics Seminar, Georgia Tech, Atlanta, GA.
- Eigenvalues of the All-Ones Hypermatrix and the Poisson Product Formula** *May 2013*
International Workshop of Spectral Graph and Hypergraph Theory, Fuzhou, P. R. China.
- Spectra of Hypergraphs** *Jun 2012*
Zhejiang University, Hangzhou, P. R. China.
- Spectra of Hypergraphs** *Jun 2012*
International Conference on the Spectral Theory of Tensors, Tianjin, P. R. China.
- Spectra of Hypergraphs** *May 2012*
Tsinghua University, Beijing, P. R. China.
- The Minimum Number of Givens in a Fair Sudoku Puzzle is 17** *Mar 2012*

- Hudson Colloquium, Armstrong Atlantic State University, Savannah, GA.
- Deterministic Random Walks** *Mar 2012*
Wake Forest University, Winston-Salem, NC.
- Reconstructing Trees and a Waring-type Problem on Partitions** *Sep 2010*
USC-Sumter Mathematics Seminar, Sumter, SC.
- Open Problems & Topics** *Jul 2009*
REGS, University of Illinois, Urbana-Champaign, Urbana, IL.
- Liar Games, Optimal Codes, and Deterministic Simulation of Random Walks** *May 2009*
Georgia Tech Combinatorics Seminar, Atlanta, GA.
- Roto-Router Analysis of the Liar Game** *Mar 2009*
Ulam Centennial Conference, Gainesville, FL.
- Triple Systems with the Sum Property** *Jul 2008*
ETSU-REU Seminar, Johnson City, TN.
- Where do power laws come from?** *Apr 2007*
Georgia Tech Seminar, Atlanta, GA.
- Finite Plane Kakeya Problem & Collinear Points in Permutations** *Apr 2007*
Georgia Tech Combinatorics Seminar, Atlanta, GA.
- Deterministic Random Walks** *Mar 2007*
Howard University Mathematics Department Colloquium, Washington, DC.
- Quasirandom Permutations** *Mar 2007*
IIT Mathematics Department Colloquium, Chicago, IL.
- Random Linear Extensions of Grids** *Mar 2007*
IIT Combinatorics Seminar, Chicago, IL.
- Random Linear Extensions of Grids** *Dec 2006*
Georgia Tech Combinatorics Seminar, Atlanta, GA.
- Foundations of Quasirandomness** *Apr 2006*
DIMACS/DIMATIA/Renyi Combinatorial Challenges Meeting, Piscataway, NJ.
- Quasirandom Permutations** *Feb 2005*
DOCCOURSE: Modern Ramsey Theory, Prague, Czech Republic.
- Cycles for other Shapes of Sliding Window** *Dec 2004*
Generalizations of de Bruijn Cycles and Gray Codes, Banff, Alberta, Canada.

Erdős-Hajnal Sets and Semigroup Decompositions *Nov 2004*
Princeton Combinatorics Seminar, Princeton, NJ.

Generalized de Bruijn Cycles *Sep 2004*
CUNY Combinatorics Seminar, New York, NY.

A Permutation Regularity Lemma *Jun 2004*
NSF/CBMS Regional Research Conference in Mathematical Sciences on The Combinatorics of Large Sparse Graphs, San Marcos, CA.

Quasirandom Permutations *Nov 2003*
UW Discrete Math Seminar, University of Washington, Seattle, WA.

Quasirandomness and Fourier Coefficients *Nov 2003*
Texas A&M, College Station, TX.

A Generalization of Zaremba's Conjecture *Nov 2003*
Texas A&M, College Station, TX.

De Bruijn Covering Codes *Nov 2003*
Texas A&M, College Station, TX.

Quasirandom Permutations *Oct 2003*
Microsoft Research, Redmond, WA.

Quasirandom Permutations *Feb 2003*
Graph Theory Seminar, Georgia Tech, Atlanta, GA.

• **Invited Short Form**

Recurrence Ranks and Moment Sequences *May 2021*
Combinatorial & Additive Number Theory, New York, NY (online).

Grid-Ramsey Problems *Jan 2021*
Birthday Conference for Steve Fenner, Columbia, SC (online).

Characteristic Power Series of Graph Limits *Dec 2019*
Conference on Graph Theory and its Applications: a Tribute to Professor Fan Chung, Tsinghua Sanya International Mathematics Forum, Sanya, Hainan, P. R. China.

Semi-Definiteness over Finite Fields and Graph Pressing Sequences *Mar 2019*
AMS Spring Southeastern Sectional Meeting, Auburn, AL.

Minimum Bottleneck Weight of Random Pressing Sequences and Related Processes *Mar 2019*
AMS Spring Southeastern Sectional Meeting, Auburn, AL.

- A generalization of the Harary-Sachs Theorem to hypergraphs** *Oct 2018*
AMS Central Sectional Meeting, Ann Arbor, MI.
- Adjacency spectra of hypertrees and hypergraphs with few eigenvalues** *May 2018*
ICOMAS 2018, Memphis, TN.
- Analytic Connectivity of Uniform Hypergraphs** *Nov 2016*
AMS Fall Southeastern Sectional, Raleigh, NC.
- Spectra of Random Symmetric Hypermatrices and Random Hypergraphs** *Jun 2016*
SIAM-DM 2016, Atlanta, GA.
- Successful Pressing Sequences for a Bicolored Graph and Binary Matrices** *Mar 2016*
AMS Southeastern Section Meeting, Athens, GA.
- Successful Pressing Sequences for a Bicolored Graph and Binary Matrices** *Jan 2016*
Networked Life (Chung/Graham Retirement), San Diego, CA.
- Spectra of Random Symmetric Hypermatrices and Random Hypergraphs** *Oct 2015*
AMS Southeastern Section Meeting, Memphis, TN.
- Successful Pressing Sequences for a Bicolored Graph and Binary Matrices** *Jun 2015*
Connections in Discrete Mathematics, Burnaby, BC, Canada.
- Deducing vertex weights from empirical occupation times** *Nov 2014*
AMS Southeastern Section Meeting, Greensboro, NC.
- Homogeneous adjacency spectra of random hypergraphs** *Aug 2014*
International Linear Algebra Society Meeting 2014, Seoul, Korea.
- The Complexity of Counting Poset and Permutation Patterns** *Jul 2014*
12th International Permutation Patterns Conference, Johnson City, TN.
- Eigenvalue Stability under Hypermatrix Perturbation and Random Hypergraphs** *Jun 2014*
SIAM Discrete Math 2014, Minneapolis, MN.
- Combinatorial Explosion: The Mathematical Limits of Computation** *Mar 2014*
Science on Screen Film Festival, Nickelodeon Theater, Columbia, SC.
- When is Counting Linear Extensions Easy?** *Oct 2013*
AMS Southeastern Sectional Meeting, University of Louisville, Louisville, KY.

- Spectra of Hypergraphs** *Nov 2011*
Atlanta Lecture Series in Combinatorics and Graph Theory, Atlanta, GA.
- Spectra of Hypergraphs** *Sep 2011*
AMS Southeastern Sectional Meeting, Winston-Salem, NC.
- Spectra of Hypergraphs** *May 2011*
Random Structures & Algorithms 2011, Atlanta, GA.
- Spectra of Hypergraphs** *Apr 2011*
SIAM-SEAS 2011, Charlotte, NC.
- Spectra of Hypergraphs** *Mar 2011*
AMS Southeastern Sectional Meeting, Statesboro, GA.
- The Mathematics of Sudoku** *Oct 2010*
Gathering for Gardner (G4G), Columbia, SC.
- Reconstructing Trees and a Waring-type Problem on Partitions** *Jun 2010*
SIAM Conference on Discrete Mathematics, Austin, TX.
- Tree Reconstruction and a Waring-Type Problem on Partitions** *Dec 2009*
PANTS XI, Columbia, SC.
- The Discrepancy of the Lexicographically Least de Bruijn Cycle** *Apr 2009*
SERMON 2009, Greensboro, NC.
- Roto-Router Analysis of the Liar Game** *Apr 2009*
SIAM-SEAS 2009, Columbia, SC.
- Monochromatic Boxes in Colored Grids** *Oct 2008*
2008 Fall AMS Southeastern Section Meeting, Huntsville, AL.
- Monochromatic Boxes in Colored Grids** *Oct 2008*
The 23rd Clemson Mini-Conference, Clemson, SC.
- Learning Vertex Weights from Sample Mean Occupation Times** *May 2008*
Int. Conf. on Interdisciplinary Mathematical & Statistical Techniques, Memphis, TN.
- Discrete Stochastic Differentiation** *Oct 2007*
Mini-Conference on Applied Combinatorics, Columbia, SC.
- Discrete Stochastic Differentiation** *Oct 2007*
2007 AMS Fall Central Section Meeting, Chicago, IL.
- Discrete Stochastic Differentiation** *Jul 2007*
First Joint International Meeting of the AMS and PTM, Warsaw, Poland.

- Deterministic Random Walks: Recent Developments** *Apr 2007*
Random Combinatorial Structures Conference, Lincoln, NE.
- Finite Field Kakeya Problem and Collinear Triples in Permutations** *Mar 2007*
2007 AMS Spring Southeastern Section Meeting, Davidson, NC.
- Where Do Power Laws Come From?** *Mar 2007*
2007 AMS Spring Southeastern Section Meeting, Davidson, NC.
- Where Do Power Laws Come From?** *Jan 2007*
Workshop on Complex Networks and their Applications, Atlanta, GA.
- Random Linear Extensions of Grids** *Nov 2006*
2006 AMS Fall Southeastern Sectional Meeting, Fayetteville, AR.
- Deterministic Random Walks on the Integers** *Apr 2006*
Joel Spencer's 60th Birthday Conference, Piscataway, NJ.
- Deterministic Random Walks** *Jan 2006*
ANALCO '06, Miami, FL.
- Inverting Power Series Mod 2** *May 2005*
Combinatorial and Additive Number Theory 2005, New York, NY.
- A Permutation Regularity Lemma** *Apr 2005*
AMS 2005 Spring Eastern Section Meeting, Newark, DE.
- Erdős-Hajnal Sets and Semigroup Decompositions** *Mar 2005*
Learn & Workshop: Random Graphs and Probabilistic Methods, Berlin, Germany.
- Erdős-Hajnal Sets and Semigroup Decompositions** *Oct 2004*
DIMACS/DIMATIA/Rényi Working Group on Extremal Combinatorics II, Piscataway, NJ.
- A Permutation Regularity Lemma** *Jun 2004*
SIAM Conference on Discrete Mathematics, Nashville, TN.
- Simulating a Random Walk with Constant Error** *Apr 2004*
CombinaTexas, Texas A&M, College Station, TX.
- Partial Quotients Bounded in Average** *Dec 2003*
2003 West Coast Number Theory Conference, Monterey, CA.
- Quasirandomness and Continued Fractions** *Nov 2003*
Integers 2003 Conference, Carrollton, GA.
- Forbidden Subgraphs and Large Discrepancy** *Aug 2002*
SIAM Conference on Discrete Mathematics, San Diego, CA.

Asymmetric Covering Codes *Aug 2002*
SIAM Conference on Discrete Mathematics, San Diego, CA.

Quasirandom Permutations *Jan 2002*
AMS Joint Mathematics Meetings (# 973), San Diego, CA.

• **Local Contributed**

The structural of maximal non-biconnected unit distance graphs in the plane *Apr 2021*
Combinatorics Seminar, University of South Carolina, Columbia, SC.

Number theoretic problems arising from a graph theoretic investigation *Mar 2021*
Algebraic Geometry & Number Theory Seminar, University of South Carolina, Columbia, SC.

Around the Brouwer Conjecture, Part III: Failure for Signed Graphs *Aug 2020*
Combinatorics Seminar, University of South Carolina, Columbia, SC.

The Mathematics of Sudoku *Apr 2020*
Undergraduate Awards Ceremony / PME Seminar, University of South Carolina, Columbia, SC.

Around the Brouwer Conjecture II *Feb 2020*
Combinatorics Seminar, University of South Carolina, Columbia, SC.

Proof of the Sensitivity Conjecture II *Feb 2020*
Algebra & Logic Seminar, University of South Carolina, Columbia, SC.

Proof of the Sensitivity Conjecture *Feb 2020*
Algebra & Logic Seminar, University of South Carolina, Columbia, SC.

Around the Brouwer Conjecture *Feb 2020*
Combinatorics Seminar, University of South Carolina, Columbia, SC.

Undecidability in Learning Theory III *Mar 2019*
Algebra & Logic Seminar, University of South Carolina, Columbia, SC.

Undecidability in Learning Theory II *Mar 2019*
Algebra & Logic Seminar, University of South Carolina, Columbia, SC.

Undecidability in Learning Theory I *Mar 2019*
Algebra & Logic Seminar, University of South Carolina, Columbia, SC.

Solving for Multiplicities of Roots When Low-Codegree Coefficients are Known

- (III)** *Oct 2018*
Algebra & Logic Seminar, University of South Carolina, Columbia, SC.
- Solving for Multiplicities of Roots When Low-Codegree Coefficients are Known (II)** *Oct 2018*
Algebra & Logic Seminar, University of South Carolina, Columbia, SC.
- Solving for Multiplicities of Roots When Low-Codegree Coefficients are Known (I)** *Sep 2018*
Algebra & Logic Seminar, University of South Carolina, Columbia, SC.
- Graph Pressing Sequences and Linear Algebra over \mathbb{F}_2** *Sep 2018*
Graduate Colloquium, University of South Carolina, Columbia, SC.
- Packing Tetrahedra Around a Point** *May 2018*
AP Calculus Day, University of South Carolina, Columbia, SC.
- Tower-Type Bounds for Unavoidable Words III** *Mar 2018*
Algebra & Logic Seminar, University of South Carolina, Columbia, SC.
- Tower-Type Bounds for Unavoidable Words II** *Mar 2018*
Algebra & Logic Seminar, University of South Carolina, Columbia, SC.
- Tower-Type Bounds for Unavoidable Words I** *Mar 2018*
Algebra & Logic Seminar, University of South Carolina, Columbia, SC.
- Adjacency Spectra of Hypertrees and other Hypergraphs with Few Eigenvalues** *Nov 2017*
Combinatorics Seminar, University of South Carolina, Columbia, SC.
- Pressing Sequences and Binary Matrix Algebra** *Oct 2017*
Combinatorics Seminar, University of South Carolina, Columbia, SC.
- Deducing Vertex Weights from Empirical Occupation Times** *Apr 2017*
Combinatorics Seminar, University of South Carolina, Columbia, SC.
- Complexity of Graph Pressing: Matrix Algebra, MCMC, and Permutation Metrics** *Sep 2016*
Algebra & Logic Seminar, University of South Carolina, Columbia, SC.
- Pressing Games** *Sep 2016*
Algebra & Logic Seminar, University of South Carolina, Columbia, SC.
- Throwing a Ball as Far as Possible, Revisited** *Sep 2016*
Combinatorics Seminar, University of South Carolina, Columbia, SC.
- More on the Erdős-Hajnal Conjecture** *Sep 2015*
Algebra & Logic Seminar, University of South Carolina, Columbia, SC.

- More on the Erdős-Hajnal Conjecture** *Sep 2015*
Algebra & Logic Seminar, University of South Carolina, Columbia, SC.
- The Erdős-Hajnal Conjecture** *Sep 2015*
Algebra & Logic Seminar, University of South Carolina, Columbia, SC.
- Avoiding Approximate Repetitions** *Sep 2015*
Algebra & Logic Seminar, University of South Carolina, Columbia, SC.
- Combinatorial Trials and Tribulations** *Sep 2015*
Graduate Student Seminar, University of South Carolina, Columbia, SC.
- Spectra of Random Hypergraphs and the Symmetric Bernoulli Hyperensemble** *Sep 2015*
Discrete Math Seminar, University of South Carolina, Columbia, SC.
- The Complexity of Counting Poset and Permutation Patterns** *Sep 2014*
Discrete Math Seminar, University of South Carolina, Columbia, SC.
- Sudoku and Graph Theory: Critical Sets** *Mar 2014*
Discrete Math Seminar, University of South Carolina, Columbia, SC.
- Sudoku and Graph Theory: Critical Sets** *Feb 2014*
USC PME/Gamecock Math Club 7th Annual Sudoku Championship, Columbia, SC.
- The Discrepancy of the Lexicographically Least de Bruijn Cycle** *Nov 2013*
Discrete Math Seminar, University of South Carolina, Columbia, SC.
- When is Counting Linear Extensions Easy?** *Sep 2013*
Discrete Math Seminar, University of South Carolina, Columbia, SC.
- On the Reciprocal of the Binary Generating Function for the Sum of Divisors** *Oct 2012*
USC Number Theory Seminar, Columbia, SC.
- The Minimum Number of Givens is 17!** *Jan 2012*
Pi Mu Epsilon / Gamecock Math Club Sudoku Contest, Columbia, SC.
- Hall's Theorem for Hypergraphs** *Oct 2011*
USC Combinatorics Seminar, Columbia, SC.
- Expander Graphs: Prep. for Dinur's Proof of the PCP Theorem** *Oct 2011*
USC Algebra & Logic Seminar, Columbia, SC.
- The Polynomial Interpolation Matroid** *Sep 2011*
USC Combinatorics Seminar, Columbia, SC.

- The Smooth Digraph Theorem II** *Apr 2011*
USC Algebra and Logic Seminar, Columbia, SC.
- The Smooth Digraph Theorem I** *Apr 2011*
USC Algebra and Logic Seminar, Columbia, SC.
- The Kun-Szegedy Proof of the Hell-Nešetřil Theorem III** *Jan 2011*
USC Algebra and Logic Seminar, Columbia, SC.
- The Kun-Szegedy Proof of the Hell-Nešetřil Theorem II** *Jan 2011*
USC Algebra and Logic Seminar, Columbia, SC.
- The Kun-Szegedy Proof of the Hell-Nešetřil Theorem I** *Jan 2011*
USC Algebra and Logic Seminar, Columbia, SC.
- Intro. to Expander Graphs & their Appl. to Compressed Sensing III** *Mar 2010*
USC Compressed Sensing Seminar, Columbia, SC.
- Intro. to Expander Graphs & their Appl. to Compressed Sensing II** *Mar 2010*
USC Compressed Sensing Seminar, Columbia, SC.
- Intro. to Expander Graphs & their Appl. to Compressed Sensing I** *Mar 2010*
USC Compressed Sensing Seminar, Columbia, SC.
- Uniquely C_4 -Saturated Graphs II** *Mar 2010*
USC Combinatorics Seminar, Columbia, SC.
- Uniquely C_4 -Saturated Graphs I** *Feb 2010*
USC Combinatorics Seminar, Columbia, SC.
- How to Choose a Random Sudoku Board** *Nov 2009*
PME/GMC 3rd Annual Sudoku Championship, Columbia, SC.
- Linearly Bounded Liars, Adaptive Covering Codes, and Deterministic Random Walks** *Sep 2009*
USC Combinatorics Seminar, Columbia, SC.
- The Discrepancy of the Lexicographically Least de Bruijn Cycle** *Feb 2009*
USC Combinatorics Seminar, Columbia, SC.
- The Mathematics of Sudoku** *Nov 2008*
USC Gamecock Math Club/IIME 2008 Sudoku Contest, Columbia, SC.
- Pythagorean Partition-Regularity and Triple Systems with the Sum Property** *Sep 2008*
USC Combinatorics Seminar, Columbia, SC.
- Symmetric and Asymptotically Symmetric Permutations II** *Mar 2008*

USC Combinatorics Seminar, Columbia, SC.

Symmetric and Asymptotically Symmetric Permutations I *Mar 2008*
USC Combinatorics Seminar, Columbia, SC.

Ladner's Theorem *Feb 2008*
USC Algebra & Logic Seminar, Columbia, SC.

Klee's Measure Problem, Multiobjective Optimization, and Monotone Boolean Functions *Feb 2008*
USC Combinatorics Seminar, Columbia, SC.

Discrete Stochastic Differentiation *Sep 2007*
USC Combinatorics Seminar, Columbia, SC.

Collinear Triple Hypergraphs and the Finite Plane Kakeya Problem *Oct 2006*
USC Number Theory Seminar, Columbia, SC.

Random Linear Extensions of Grids *Sep 2006*
USC Combinatorics Seminar, Columbia, SC.

Collinear Points in Permutations and the Finite Plane Kakeya Problem *Jul 2006*
UCSD Combinatorics Seminar, San Diego, CA.

Random Linear Extensions of Grids *Jun 2006*
UCSD Combinatorics Seminar, San Diego, CA.

Deterministic Random Walks on the Integers *Mar 2006*
Mittagsseminar, ETH-Zürich.

Missing Induced Subgraphs *Oct 2005*
Mittagsseminar, ETH-Zürich.

What Keeps Me Up At Night *Oct 2005*
Mittagsseminar, ETH-Zürich.

Cycles for Other Shapes of Sliding Window *Dec 2004*
Courant Institute Geometry Seminar, New York, NY.

Erdős-Hajnal Sets and Semigroup Decompositions *Nov 2004*
Courant Institute Geometry Seminar, New York, NY.

Quasirandom Permutations *Mar 2004*
Courant Institute Probability and Mathematics Physics Seminar, New York, NY.

Quasirandom Permutations *Jun 2003*
Thesis Defense, UCSD, San Diego, CA.

Abstract Line Configurations and the Milnor-Thom Theorem *Oct 2002*
Combinatorics Seminar, UCSD, San Diego, CA.

4-cycle-free Graphs and Homogeneous Subsets *Apr 2002*
Combinatorics Seminar, UCSD, San Diego, CA.

Directed Covering Codes - An Update *Jan 2002*
Combinatorics Seminar, UCSD, San Diego, CA.

The Theory of Quasirandom Permutations *Oct 2001*
Combinatorics Seminar, UCSD, San Diego, CA.

Matroids and Heart-Shaped Lattices *Feb 2001*
Combinatorics Seminar, UCSD, San Diego, CA.

Constructing Small Sets Uniform in Arithmetic Progressions *Apr 2001*
Combinatorics Seminar, UCSD, San Diego, CA.

• **Non-local Contributed**

Two Equators of the Permutohedron *Jun 2021*
Permutation Patterns 2021, Strathclyde, UK (remote).

Tree Reconstruction and a Waring-Type Problem on Partitions *Mar 2010*
41st Southeastern Combinatorics, Graph Theory, & Computing Conf., Boca Raton, FL.

Flawed Subgraphs and Primitive Partitions *Mar 1995*
26th Annual Combinatorics, Graph Theory, and Computing, Florida Atlantic University, Boca Raton, FL.

Research Advisement

1. Post-doc

- (a) Wei Li (9/2015–6/2016, PhD 2016 Fuzhou University)

2. PhD

- (a) Chair: Grant Fickes (USC, Mathematics PhD candidate), Gabrielle Tauscheck (USC, Mathematics PhD candidate), Utku Okur (USC, Mathematics PhD candidate), Hays Whitlatch (USC, Mathematics PhD 2019), Greg Clark (USC, Mathematics PhD 2019), Chris Edgar (USC, Mathematics PhD 2019), Danny Rorabaugh (USC, Mathematics PhD 2015), David Collins (USC, Mathematics PhD 2013), Aaron Dutle (USC, Mathematics PhD 2012), Mark Walters (USC, Mathematics PhD 2009).
- (b) Committee: Anna Kirkpatrick (GATech, Mathematics PhD 2021), Joshua Thompson (USC, Mathematics PhD 2020), Inne Singgih (USC, Mathematics PhD 2019),

Zhiyu Wang (USC, Mathematics PhD 2019), Joshua Grice (USC, PhD 2019), Trevor Olsen (USC, Mathematics PhD 2019), Shuliang Bai (USC, Mathematics PhD 2018), Garner Cochran (USC, Mathematics PhD 2018), Hai Jin (USC, Geography PhD 2017), Nathan Faulkner (USC, Mathematics PhD 2015), Kamala Diefenthaler (USC, Mathematics PhD 2013), Austin Mohr (USC, Mathematics PhD 2013), Xing Peng (USC, Mathematics PhD 2012), Andrew Vincent (USC, Mathematics PhD 2012), Virginia Johnson (USC, Mathematics PhD 2012), Andrew Dove (USC, Mathematics PhD 2013), Travis Johnston (USC, Mathematics PhD 2015), Jessica Nelson (USC, Mathematics PhD 2012).

3. MS

- (a) Chair: Peter Gartland (USC, Mathematics MS 2019), Erin Hanna (USC, Mathematics MS 2018), Bill Kay (USC, Mathematics MS 2012), Bonny (Riemer) Hardesty (USC, Mathematics MS 2008)
- (b) Cochair: Brett Ermer (USC, Statistics MS 2008, joint with John Grego, USC Department of Statistics)
- (c) Committee: Jared Szi (USC, Mathematics MS Candidate), Dan White (USC, Mathematics MS 2013), Tatiana Orlova (USC, Mathematics MS 2010), Charles Cavalier (USC, Mathematics MS 2009)

4. BS

- (a) Sarah “Kaylee” Weatherspoon (USC, BS Mathematics & French), Sydney Miyasaki (USC, BS Mathematics), Andrew Smith (USC, BS CSCE & Mathematics), Hunter Damron (USC, BS CSCE & Mathematics), Joshua Nelson (USC, BS CSCE & Mathematics), Justin Baum (USC, BS CSCE), Christine Burris (USC, BS Computer Science), Noemi Glaeser (USC, BS Mathematics & Computer Science, SCHC Honors Thesis), Dylan Fillmore (USC, BS Mathematics, SCHC Honors Thesis), Quentin Bain (USC, BS Mathematics), Morgan Berman (USC, BS Finance, SCHC Honors Thesis), Ronald Austin Herrygers (USC, BS Mathematics), Harrison Engoren (USC, BS Computer Science & Engineering), David Corey Stewart (USC, BS Mathematics), Blakeley Hoffman (USC, BS Computer Science & Engineering), Abraham Khan (USC BS Mathematics), Maxwell Forst (USC, BS Mathematics), David Edelson (USC, BS Physics), Caleb Simmons (USC, BS Mathematics), Anna Kirkpatrick (USC, BS Mathematics, SCHC Honors Thesis), Leanna O’Brien (USC, BS Mathematics), Eric Miller (USC, BS Mathematics), Alexander Auerback (USC, BS Mathematics), Kimberly Selsor (USC, BS Mathematics, SCHC Honors Thesis), Alexander Riasanovsky (University of Pennsylvania, BS Mathematics), Nnenna Anoruo (USC, BS Mathematics), Jeffrey Davis (USC, BS Mathematics, SCHC Honors Thesis), Wesley Alexander (Morris College, BS Mathematics), Lewis Fordjour (Morris College, BS Mathematics), Tiara Howard (Morris College, BS Mathematics), Christopher Boyd (USC, BS Mathematics), Ralph Overstreet (USC, BS Mathematics), De’Shara Gadson (USC, BS Mathematics), Artem Aleshin (USC, BS Mathematics), Oliver Holmes (Morris College, BS Mathematics), Nicholas Smith (USC, BS Mathematics), Bill Kay (USC, BS Mathematics, SCHC Honors Thesis), Andrew Mammoth (USC, BS Mathematics), Andrew Petrarca (USC, BS Nuclear Engineering), Chris Poirel (USC, BS Mathematics), Joshua King (USC, BS Mathematics).

5. High School

- (a) Alexander Riasanovsky (South Carolina Governor's School for Science and Mathematics, diploma June 2012), Jacob Folks (South Carolina Governor's School for Science and Mathematics), Seung Mok Lee (Gyeonggi Science High School), Sydney Miyasaki (South Carolina Governor's School for Science and Mathematics).