
EDUCATION

- Ph.D., Mathematics, Temple University, Philadelphia, May 1999.
Thesis advisor: Doron Zeilberger.
Thesis title: *Some New Results in Ramsey Theory*.
- B.S., Mathematics, University of Michigan, Ann Arbor, May 1993.
Graduated *with highest distinction* (top 3% of graduating class).
Elected to Phi Beta Kappa.

EMPLOYMENT

- July 1999 - June 2005 Assistant Professor of Mathematics, Colgate University
- July 2005 - June 2012 Associate Professor of Mathematics, Colgate University
- July 2012 - present Professor of Mathematics, Colgate University

RESEARCH INTERESTS

- Combinatorics: Ramsey theory, enumerative combinatorics.

PUBLICATIONS (Historically ordered)

- (1) Review of Social Security Financing and Related Matters
(Coauthors: Cecil J. Nesbitt (lead author) and Felicity Messner)
Actuarial Research Clearing House **1993.1** (1993), 249-282.
- (2) A 2-Coloring of $[1, N]$ Can Have $N^2/22 + O(N)$ Monochromatic Schur Triples, But Not Less!
(Coauthor: Doron Zeilberger)
Electronic Journal of Combinatorics **5** (1998), R19, 4pp.
- (3) New Lower Bounds for Some Multicolored Ramsey Numbers
Electronic Journal of Combinatorics **6** (1999), R3, 6pp.
- (4) Permutations Containing and Avoiding 123 and 132 Patterns
Discrete Mathematics and Theoretical Computer Science **3** (1999), 119-122.
- (5) Permutation Patterns and Continued Fractions
(Coauthors: Herbert S. Wilf, Doron Zeilberger)
Electronic Journal of Combinatorics **6** (1999), R38, 6pp.

- (6) Difference Ramsey Numbers and Issai Numbers
Advances in Applied Mathematics **25** (2000), 153–162.
- (7) Off-diagonal Generalized Schur Numbers
(Coauthor: Daniel Schaal)
Advances in Applied Mathematics **26** (2001), 252–257.
- (8) Permutations Restricted by Two Distinct Patterns of Length Three
Advances in Applied Mathematics **27** (2001), 548–561.
- (9) New Lower Bound Formulas for Some Multicolored Ramsey Numbers
Electronic Journal of Combinatorics **9** (2002), R13, 6pp.
- (10) On Generalized Van der Waerden Triples
(Coauthor: Bruce Landman)
Discrete Mathematics **256** (2002), 279–290.
- (11) Refined Restricted Permutations Avoiding Subsets of Patterns of Length Three
(Coauthor: Toufik Mansour)
Annals of Combinatorics **6** (2002), 407–418.
- (12) Refined Restricted Permutations
(Coauthors: Dan Saracino and Doron Zeilberger)
Annals of Combinatorics **6** (2002), 427–444.
- (13) *Ramsey Theory on the Integers*
(Coauthor: Bruce Landman)
American Mathematical Society, STML **24**, 2004, xvi + 317 pages.
- (14) Restricted Permutations from Catalan to Fine and Back
Séminaire Lotharingien de Combinatoire **50** (2004), B50g, 13pp.
- (15) Some New Exact van der Waerden Numbers
(Coauthors: Bruce Landman and Clay Culver ([undergraduate student](#)))
Integers **5(2)** (2005), 11pp.
- (16) On the Degree of Regularity of Generalized van der Waerden Triples
(Coauthors: Nikos Frantzikinakis and Bruce Landman)
Advances in Applied Mathematics **37** (2006), 124–128.
- (17) Refined Restricted Involutions
(Coauthors: Emeric Deutsch and Dan Saracino)
European Journal of Combinatorics **28** (2007), 481–498.
- (18) On Monochromatic Ascending Waves
(Coauthor: Tim LeSaulnier ([undergraduate student](#)))
in *Combinatorial Number Theory*, Proceedings in Mathematics Series, deGruyter, 2007, 13pp.
- (19) Two Color Off-diagonal Rado-type Numbers
(Coauthor: Kellen Myers ([undergraduate student](#)))
Electronic Journal of Combinatorics **14** (2007), #R53, 10pp.
- (20) A Method for Quantifying Rotation Symmetry
(Coauthors: Frank Frey and Michael Bukoski ([undergraduate student](#)))
New Phytologist **175** (2007), 785–791.
- (21) Avoiding Monochromatic Sequences with Special Gaps
(Coauthor: Bruce Landman)
SIAM Journal of Discrete Math **21** (2007), 794–801.

- (22) On the Asymptotic Minimum Number of Monochromatic 3-Term Arithmetic Progressions
(Coauthors: Pablo Parrilo and Dan Saracino)
Journal of Combinatorial Theory Series A **115** (2008), 185-192.
- (23) Some Two Color, Four Variable Rado Numbers
(Coauthor: Kellen Myers ([undergraduate student](#)))
Advances in Applied Math **41** (2008), 214-226.
- (24) Bounds on Some van der Waerden Numbers
(Coauthors: Tom Brown and Bruce Landman)
Journal of Combinatorial Theory Series A **115** (2008), 1304-1309.
- (25) *Combinatorial Number Theory*
(Coeditors: B. Landman, M. Nathanson, J. Nešetřil, R. Nowakowski, and C. Pomerance)
de Gruyter, 2009, viii + 204 pages.
- (26) Multiplicity of Monochromatic Solutions to $X + Y < Z$
(Coauthors: Wojciech Kosek, Dusty Sabo, and Daniel Schaal)
Journal of Combinatorial Theory Series A **117(8)** (2010), 1127-1135.
- (27) Van der Waerden's Theorem and Avoidability in Words
(Coauthors: Yu-Hin Au and Jeffrey Shallit)
Integers **11** (2011), 15pp.
- (28) *Combinatorial Number Theory: Proceedings of Integers Conference 2011*
(Coeditors: B. Landman, M. Nathanson, J. Nešetřil, R. Nowakowski, and C. Pomerance)
de Gruyter, 2013, ix + 157 pages.
- (29) *Ramsey Theory on the Integers, Second Edition*
(Coauthor: Bruce Landman)
American Mathematical Society, STML **73**, 2014, xx + 384 pages.
- (30) A Probabilistic Threshold for Monochromatic Arithmetic Progressions
Journal of Combinatorial Theory Series A **137** (2016), 79-87.
- (31) Intermingled Ascending Wave m -Sets
(Coauthors: Caitlin Cremin, Will Daniel, and Quer Xiang (all [undergraduate students](#)))
Discrete Mathematics **339** (2016), 560-563.
- (32) The Determination of 2-color Zero-sum Generalized Schur Numbers
(Coauthors: Bidisha Roy and Subha Sarkar)
Integers **18** (2018), #A96.
- (33) Zero-Sum Generalized Schur Numbers
Journal of Combinatorics and Number Theory **10** (2018), 51-62.
- (34) Zero-Sum Analogues of Van Der Waerden's Theorem on Arithmetic Progressions
Journal of Combinatorics **11** (2020), 231-248.
- (35) Down the Large Rabbit Hole
Rocky Mountain Journal of Mathematics **50** (2020), 237-253.
- (36) On the Distribution of Monochromatic Complete Subgraphs and Arithmetic Progressions
(Coauthors: Will Cipolli and Maria Dascalu ([undergraduate student](#)))
Experimental Mathematics **30** (2020), 135-145.
- (37) *Fundamentals of Ramsey Theory*
Discrete Mathematics and Applications, CRC Press, 2021, xiv + 241 pages.

- (38) *Number Theory and Combinatorics. A Collection in Honor of the Mathematics of Ronald Graham*
(Coeditors: B. Landman, F. Luca, M. Nathanson, and J. Nešetřil)
de Gruyter, 2022, viii + 362 pages.
- (39) *Combinatorial Game Theory. A Special Collection in Honor of Elwyn Berlekamp, John H. Conway and Richard K. Guy*
(Coeditors: B. Landman, F. Luca, M. Nathanson, J. Nešetřil, and R. Nowakowski)
de Gruyter, 2022, xiv + 416 pages.
- (40) Ramsey Properties for Integer Sequences with Restricted Gaps
(Coauthors: Bruce Landman and Quinn Robertson)
Moscow Journal of Combinatorics and Number Theory **12** (2023), 181-195.
- (41) Arithmetic Progressions, Quasi Progressions, and Gallai-Ramsey Colorings
(Coauthors: Yaping Mao, Kenta Ozeki, and Zhao Wang)
Journal of Combinatorial Theory, Series A **193** (2023), Article 105672.
- (42) Monochromatic Strictly Ascending Waves and Permutation Pattern Waves
(Coauthor: Bruce Landman)
Advances in Applied Math **146** (2023), Article 102501.
- (43) On the Minimum Number of Monochromatic 2-Dimensional Schur Triples
Integers **24A** (2024), #A16.

MATH MAJOR THESES DIRECTED

1. Schur's Theorem Over Finite Fields
Caroline Wardlow, 2016.
2. Algorithmic Solution to Rado's Columns Condition
Dylan Giustra, 2016.
3. Some New Difference Ramsey Numbers
Jiayang Li, 2016.
4. A Classification of Exponents that Form Triangles
Dan Pucci, 2016.
5. On the Non-Uniqueness of Entropy
Skylar Weber, 2016.
6. Looking at Discrete Derivatives for Monomials
Ames Tardio, 2016.
7. Survival Free-fall in Newtonian Mechanics
Alice Mi, 2017.
8. An Investigation of the Abundancy Index
Adam Buys, 2017.
9. Finding a Class of 4×4 Matrices on Which the Rule of Sarrus Can Be Applied
Jordan Chervin, 2017.
10. Elliptic Curve Cryptography
Robert Galante, 2017.

11. Arithmetic Derivative on Complex Numbers
Michael Heins, 2017.
12. Analysis of the Puck Puzzle
Kil Hyun Kim, 2017.
13. Van der Waerden's Theorem on Sequences with Interchanging Gap Sizes
Daoyang Shan, 2017.
14. Change-Making Problems in the World of Even Value
Limin Tang, 2017.
15. Computerized Proofs of Hypergeometric Identities
Nicole Brower, 2019.
16. Exploring Equi-Colored Arithmetic Progressions on Equi-Colored Two-Colorings
Jackson French, 2019.
17. A Non-trivial Lower Bound for a van der Waerden-like Function
Lumbardh Halitjaha, 2019.
18. Investigating Feynman's Integration Technique
San Kyung Lee, 2019.
19. Determining Knight-distance Between Squares on an $n \times n$ Chessboard
Ruchit Shrestha, 2019. *High Honors*
20. Discrete Dynamical System Modeling to Solve a Card Trick
Maddie Srivastava, 2019.
21. Fast Inverse Square Root Algorithm
Serena Sutaria, 2019.
22. Lattice Points on the Surface of n -spheres for Small n
Ruiyun Tang, 2019.
23. Monte Carlo and Quasi-Monte Carlo Integration
Saiyang Zhang, 2019.
24. The Non-uniqueness of Entropy of Probability Distributions
Ethan Ackerman, 2019.
25. Eigenvalues of a Path, Its Complement, and the Associated Adjacency Matrices
Julia Blackwell, 2019.
26. Using Contour Integration for Infinite Sums
Kelly Goodwin, 2019.
27. Solving the Generalization of a Putnam Problem
Hannah Bailey, 2019.
28. Finding Derivatives Without the Use of Limits
Katherine Ellsworth, 2019.
29. Using Markov Chains to Imitate Authors' Styles
Kayla Logar, 2019. *High Honors*
30. Constructing Derivative Rules for Positive Integers
Malachi Jones, 2019.

31. Quick Algorithm for Finding Point Location
Phillip Matos, 2019. *High Honors*
32. Exploring a Set of Matrices
Brooke Perisho, 2019.
33. Finding Solutions to Initial Conditions of a 5×5 Gameboard With Tiles Linked by Adjacency
Tyler Nelson, 2019.
34. Maximal Distance Sets in 2-dimensional Euclidean Space
Elzbieta Boldyriew, 2020. *High Honors*
35. Distribution of the Average Shortest Path Length in Random Graphs
Jack Koefoed, 2020.
36. Exploring Multiples of a Real Number
Sydney Maxson, 2020.
37. 3×3 Magic Squares and the Existence of Magic Triangles
Nicole Joyal, 2020.
38. Sums of Powers: Divisibility, Formulation, and a Matrix Method
Mohammad Omair, 2020.
39. Analysis of Directional Grids
Nicholas Coeytaux, 2021.
40. Asymmetric Hales-Jewett Numbers
Nathan Conlon, 2021. *High Honors*
41. Modular Applications of Fourier Analysis
Greta Ferdinand, 2021.
42. The Quantum Bit and Quantum Key Exchange
Nam Nguyen, 2021.
43. Elementary Properties of Some Integer Sequences
Qizhe Pan, 2021.
44. Eventown and Oddtown with Even and Odd Intersections
Jayvion Queen, 2021.
45. Optimus Prime: The Circle Method and Infinite Three-Term Arithmetic Progressions of Primes
Rachel Schaaf, 2021. *Honors*

INVITED TALKS

- (September, 1998) *Schur Triples and Difference Ramsey Numbers*, Combinatorics Seminar, University of Pennsylvania.
- (September, 1998) *Difference Ramsey Numbers*, EPADEL Section of the MAA, Lehigh University.
- (January, 1999) *Using Recurrence Relations in Ramsey Theory* (20 minute invited speaker), Special Session on Discrete Models and Difference Equations, Joint Mathematics Meeting, San Antonio, TX.
- (April, 1999) *Difference Ramsey Numbers and Issai Numbers*, Departmental Colloquium, William Patterson University.

- (November, 1999) *Generalized Van der Waerden Triples* (30 minute invited speaker), Third UNCG Conference in Combinatorics and Graph Theory, University of North Carolina at Greensboro.
- (November, 1999) *Avoiding Patterns*, Science Colloquium, Colgate University.
- (November, 2000) *Pattern Avoiding and Containing Permutations* (30 minute invited speaker), Fourth UNCG Conference in Combinatorics and Graph Theory, University of North Carolina at Greensboro.
- (March, 2003) *Permutations from Catalan to Fine and Back* (30 minute invited speaker), Séminaire Lotharingien de Combinatoire, Ottrott, France.
- (October, 2003) *Permutations from Catalan to Fine and Back* (30 minute invited speaker), Integers Conference 2003, State University of West Georgia.
- (February, 2004) *Ramsey Theory for the Masses*, Science Colloquium, Colgate University.
- (April, 2007) *An Off-diagonal Version of a Theorem of Rado* (50 minute invited speaker), Experimental Math Seminar, Rutgers University.
- (October, 2007) *Van der Waerden Numbers and Related Functions* (20 minute invited speaker), Integers Conference 2007, University of West Georgia.
- (February, 2008) *The State of Ramsey Theory* (50 minute special colloquium), Lafayette College.
- (October, 2009) *On Monochromatic Solutions to $X + Y < Z$* (20 minute invited speaker), Integers Conference 2009, University of West Georgia.
- (May, 2010) *Trudging Through the 2-Large Conjecture* (20 minute invited speaker), Recent Progress in Classical Combinatorics: A Conference, Rutgers University.
- (October, 2011) *A New Lower Bound for Certain Off-Diagonal Van der Waerden Numbers* (20 minute invited speaker), Integers Conference 2011, University of West Georgia.
- (March, 2012) *On the 2-Large Conjecture* (50 minute invited speaker), Simon Frasier Combinatorics Seminar.
- (October, 2016) *Ramsey and Delaporte* (20 minute invited speaker), Integers Conference 2016, University of West Georgia.
- (March, 2017) *Yes, It's a Math Talk*, Science Colloquium, Colgate University.
- (April, 2017) *Probability and Ramsey Theory* (50 minute invited speaker), Rutgers Experimental Math Seminar.
- (January, 2018) *On the Distribution of Ramsey Objects* (20 minute invited speaker), Joint Mathematics Meeting, San Diego
- (July, 2018) *Ramsey Objects and Delaporte* (50 minute invited speaker), Ramsey Theory in Logic, Combinatorics and Complexity, Bertinoro, Italy
- (July, 2021) *The Thread of Ramsey Theory in Zeilberger's Work* (30 minute invited speaker), Combinatorics and Algebra, Weizmann Institute of Science, online.

PROFESSIONAL ACTIVITIES

- Department Chair, Colgate University, July 2023 to present.
- Department Chair, Colgate University, July 2014 to June 2017. Major accomplishments include: stewarding an Applied Math major proposal to fruition through a department with vastly disparate ideas; handling one successful tenure case and two successful third-year review cases; obtaining two incremental positions for the department while Colgate had a university-wide non-expansion agenda;

completed a curriculum overhaul through thoughtful sequencing of courses and the addition of many new, and unique to Colgate, courses. Implemented a thesis requirement for all majors.

- Technical Editor (formerly Associate Managing Editor) of *Integers* (<http://www.integers-ejcnt.org>), since 1999. Since 1999, have been responsible for the publication of (as of 9.16.21) around 1800 articles; coordinated with deGruyter publishing while the journal appeared both online and in print.
- Co-chair with Doron Zeilberger and co-organizer with George Andrews, Richard Askey, Herb Wilf, and Doron Zeilberger of *Classical Combinatorics: An International Conference* (July 2000).
- Co-chair with George Andrews, Victor Moll, Jim Propp, Herb Wilf, and Melkamu Zeleke of *Recent Progress in Classical Combinatorics: A Conference* (May 2010).
- Guest editor for the FoataFest proceedings, appearing as a special issue of *Advances in Applied Mathematics* for which I was coauthor, with Joseph Kung and Doron Zeilberger, of an introduction/biographical sketch of Foata.
- Referee for: *Advances in Applied Mathematics*, *American Math. Monthly*, *Ars Combinatorica*, *Australasian Journal of Combinatorics*, *Computers and Mathematics with Applications*, *Discrete Mathematics*, *Discrete Mathematics and Theoretical Computer Science*, *Electronic Journal of Combinatorics*, *Experimental Math*, *Graphs and Combinatorics*, *Integers*, *International Journal of Mathematics and Mathematical Sciences*, *Journal of Combinatorial Theory Series A*, *Journal of Combinatorics and Number Theory*, *Journal of Difference Equations and Applications*, *Rocky Mountain Journal of Mathematics*, and *Séminaire Lotharingien de Combinatoire*.
- Reviewer for *Mathematical Reviews* (mathscinet)
- Reviewer of NSF, NSA, Natural Sciences and Engineering Research Council of Canada, and Australian Science Foundation grant applications.
- Referee for a chapter in Kitaev's book *Patterns in Permutations and Words* published by Springer.
- Referee for Bóna's graduate-level book *Combinatorics of Permutations* published by Chapman-Hall/CRC Press.
- Reviewer for 6th edition of Mann's *Introductory Statistics* published by Wiley.

GRANTS

- NSA research grant for Theoretical and Computational Ramsey Theory, 2010-2012, #H98230-10-1-0204, \$30,000 to cover summer salary.
- NSF conference grant for *Recent Progress in Classical Combinatorics: A Conference*, #DMS-1001793, \$21,700.
- NSF conference grant for *Classical Combinatorics: An International Conference*, co-pi with Doron Zeilberger, #DMS-9985949, \$10,000 with matching \$10,000 from Temple University.

AWARDS

- Three-time nominee for Colgate University's Phi Eta Sigma professor of the year
- Colgate research council Associate Leave awardee
- \$50 prize from Doron Zeilberger for "almost" solving one of Ron Graham's prize problems.
- Shared \$100 prize from Ron Graham for co-solving one of his prize problems.

COURSES TAUGHT

Typically teach 5 courses per year from the following list:

- Combinatorial Problem Solving,
- Introduction to Probability,
- Introduction to Statistics (for non-majors),
- Number Theory and Mathematical Reasoning,
- Ramsey Theory,
- Real Analysis I,
- Senior Seminar (the department's capstone course).

DEPARTMENTAL SERVICE

- Departmental chair (3+ years), Actuarial advisor (14 years), renovation of departmental space committee, assessment coordinator (5 years), created and implemented the department's capstone course

INSTITUTIONAL SERVICE

- Faculty liaison for Women's Ice Hockey (16 years)
- Treasurer for Phi Beta Kappa (6 years)
- Student Activities Board (6 years)
- Goldwater scholarship review board (5 years)
- Budget and Finance Committee (3.5 years)
- Chair of Committee on Information Technology (3 years)
- Benefits Committee (3 years)
- Fulbright award review board (3 years)
- Watson fellowship review board (3 years)
- Science Colloquium organizer (2 years)
- Affirmative Action report statistical consultant (2 years)
- Alcohol and Drug Advisory Committee (1.5 years)
- Emergency Response Plan Committee (1 year)
- SET form analysis Committee (1 year)
- Research Council (1 semester)
- Picker Grant Committee (1 semester)
- Faculty liaison for Men's Basketball (July 2023 to present)