Sebastian M. Cioabă, Curriculum Vitae, October 25, 2021

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Research Discrete Mathematics, Algebra, Optimization, Computer Science, Probability.

Academic Positions

Professor, University of Delaware, USA
September 1, 2019-present.

Associate Professor, University of Delaware, USA
September 1, 2014 - August 31, 2019.

Assistant Professor, University of Delaware, USA
January 16, 2009 - August 31, 2014.

Postdoctoral Fellow, University of Toronto, Canada
July 1, 2008-December 31, 2008.
Mentor: Mike Molloy.

Postdoctoral Fellow, University of California, San Diego, USA
February 1, 2006-June 30, 2008.
Mentor: Fan Chung.

Postdoctoral Fellow, Queen's University at Kingston, Ontario, Canada
January 1-31, 2006.
Mentors: David Gregory, Ram Murty, David Wehlau.

Education

2005, Ph.D. Mathematics, Queen's University at Kingston, Ontario, Canada
Advisors: David Gregory, Ram Murty, David Wehlau.
Thesis *Eigenvalues, Expanders and Gaps between Primes.*

2002, M.Sc. Mathematics, Queen's University at Kingston, Ontario, Canada
Advisor: Dominique de Caen.
Thesis *The NP-Completeness of some Edge-Partitioning Problems.*

2000, B.Sc. Mathematics and Computer Science, University of Bucharest, Romania
Advisor: Ioan Tomescu.
Thesis *Chromatic Polynomials.*

Service

Editorial Board **Discrete Mathematics**, **Linear Algebra and its Applications**, **Linear and Multilinear Algebra**, **Electronic Journal of Linear Algebra**, **Journal of Algebraic Combinatorics Discrete Structures and Applications**.

Guest Editor Special Issue **Discrete Mathematics**
https://www.sciencedirect.com/journal/discrete-mathematics/vol/342/issue/10
dedicated to the **Algebraic and Extremal Graph Theory** Conference at University of Delaware, August 7-10, 2017.
https://www.mathsci.udel.edu/events/conferences/aegt

Editor Featured Articles for **IMAGE**, the newsletter of ILAS (International Linear Algebra Society). `http://www.ilasic.org/IMAGE/`

Guest Editor of the Special Issue of **Electronic Journal of Linear Algebra**
`http://repository.uwyo.edu/ela/vol28/iss1/`
Dedicated to the David Gregory Memorial Conference *Graph Theory, Matrix Theory and Interactions*, June 2014, Queen's University, Canada.

Elected Member, Board of Directors, International Linear Algebra Society 2020-2023.

Books

1. *A First Course in Graph Theory and Combinatorics*
   i-xi + 173 pp, Hindustan Book Agency, TRIM Series, (2009).
   2nd edition finished (i-xiv+ 237pp) (2021), to appear.
   With Ram Murty
2. *Basics of Mathematics: Introduction to Proof*
   300+ pages book, in preparation, first draft fall 2021.
   With Werner Linde.

Book Chapters

1. *Ramanujan Graphs and Expanders*
   Chapter in **Handbook of Finite Fields** Discrete Math. Appl., CRC Press. Eds: Gary Mullen and Daniel Panario, (2013).
   With Ram Murty, 17 pages.
2. *Some applications of eigenvalues of graphs*
   Chapter in **Structural Analysis of Complex Networks: Theory and Applications** 357–379, Editor: Matthias Dehmer, Birkhauser Publishing USA (2011).

Papers

Erdős number 2 (via Noga Alon, Peter Cameron, Brendan McKay or Ram Murty)
AMS MathSciNet 485 citations, h-index=12, i10-index=18
zbMath 537 citations,h-index=12, i10-index=14
Scopus 697 citations, h-index=14, i10-index=26
Web of Science 829 citations, h-index=13, i10-index=21
Scholar google 1344 citations, h-index=18, i10-index=37.

1. *The spectral radius of graphs with no odd wheels*
   European Journal of Combinatorics 99 (2022), 103420.
   With Dheer Desai and Michael Tait.
2. *On the flip graphs on perfect matchings of complete graphs and signed reversal graphs*
   Australasian Journal of Combinatorics 81 (2021), 480–497.
   With Gordon Royle and Zhao Kuang Tan.
3. *The chromatic index of strongly regular graphs*
   Ars Mathematica Contemporanea 20 (2021), 187–194.
   With Krystal Guo and Willem Haemers.
4. *Identifying Brain Regions Supporting Amygdala Functionality: A Complex Anatomical Network Perspective*
   Neuroimage 244 (2021), 118614.
   With Melanie A. Matyi, Marie T. Banich and Jeffrey Spielberg.
5. *Addressing Johnson graphs, complete multipartite graphs, odd cycles and random graphs*
   Experimental Mathematics 30 no. 3 (2021), 372–382.
   With Noga Alon, Brandon Gilbert, Jack Koolen and Brendan McKay.

6. *Spectral conditions for graph rigidity in the Euclidean plane*
   Discrete Mathematics 344 (2021), 112527.
   With Sean Dewar and Xiaofeng Gu.
7. *The toughness of Kneser graphs*
   Discrete Mathematics 344 (2021), 112484.
   With Davin Park, Anthony Ostuni, Nathan Hayes, Amartya Banerjee, Tanay Wakhare and Wiseley Wong.
8. *On a question of Haemers regarding vectors in the nullspace of Seidel matrices*
   Linear Algebra and its Applications 615 (2021), 194–206.
   With Saieed Akbari, Samira Goudarzi, Aidin Niaparast and Artin Tajdini.
9. *Connectivity concerning the last two subconstituents of a Q-polynomial distance-regular graph*
   Journal of Combinatorial Theory, Series A 177 (2021), Article 105325.
   With Jack Koolen and Paul Terwilliger.
10. *The spectral radius of graphs with no intersecting triangles*
    The Electronic Journal of Combinatorics 27(4) (2020), #P4.22.
    With Lihua Feng, Michael Tait and Xiaodong Zhang.
11. *Eigenvalues of graphs and spectral Moore theorems*
    RIMS Kôkyûroku (2020), 2169: 106-119.
    available at `https://arxiv.org/abs/2004.09221`
12. *Some observations on the smallest adjacency eigenvalue of a graph*
    Discussiones Mathematicae Graph Theory 40 (2020), 467–493.
    Special Issue in honor of Slobodan K. Simić
    With Randy Elzinga and David Gregory.
13. *A spectral version of the Moore problem for bipartite regular graphs*
    Algebraic Combinatorics, Volume 2 (2019) no. 6, p. 1219–1238.
    With Hiroshi Nozaki and Jack Koolen.
14. *Optimal sampling sets in cographs*
    IEEE Data Science Workshop, Minneapolis, Minnesota, 2019.
    2019 IEEE Data Science Workshop, DSW 2019 - Proceedings 8755569, pp. 165–169, `https://2019.ieeedatascience.org/`
    With Dominique Guillot, Alejandro Parada and Gonzalo Arce.
15. *The second eigenvalue of some normal Cayley graphs of highly transitive groups*
    The Electronic Journal of Combinatorics, 26(2) (2019), P2.44, 28pp.
    With Xueyi Huang and Qingxiang Huang.
16. *Spectral characterization of complements of small paths*
    Discrete Applied Mathematics, 257 (2019), 260–268.
    With Lihuan Mao and Wei Wang.
17. *Open problems in the spectral theory of signed graphs*
    The Art of Discrete and Applied Mathematics, 1 (2018) #P2.10, 23pp.
    With Francesco Belardo, Jack Koolen and Jianfeng Wang.
18. *Spectral and combinatorial properties of some algebraically defined graphs*
    The Electronic Journal of Combinatorics, 25(4) (2018), P4.60, 16pp.
    With Felix Lazebnik and Shuying Sun.
19. *Distributed Calculation of Edge-Disjoint Spanning Trees for Robustifying Distributed Algorithms against Man-in-the-Middle Attacks*
    IEEE Transactions on Control of Network Systems, 5 (2018), 1646–1656.
    With Gabriele Oliva and Christoforos Hadjicostis.

20. *The smallest eigenvalues of Hamming graphs, Johnson graphs and other distance-regular graphs with classical parameters*
Journal of Combinatorial Theory, Series B, 133 (2018), 88–121.
With Andries Brouwer, Ferdinand Ihringer and Matt McGinnis.

21. *Cospectral mates for the union of some graphs in the Johnson scheme*
Linear Algebra and its Applications, 539 (2018), 219–228.
With Willem Haemers, Travis Johnston and Matt McGinnis.

22. *Addressing graph products and distance-regular graphs*
Discrete Applied Mathematics, 229 (2017), 46-54.
With Randy Elzinga, Michelle Markiewitz (UD Undergraduate Student), Kevin Vander Meulen and Trevor Vanderwoerd.

23. *The graphs with all but two eigenvalues* 0 *or* -2
Designs, Codes and Cryptography, 84 (2017), 153–163.
Special Issue dedicated to Andries Brouwer
With Willem Haemers and Jason Vermette.

24. *Max-cut and extendability of matchings in distance-regular graphs*
European Journal of Combinatorics, 62 (2017), 232–244.
With Jack Koolen and Weiqiang Li.

25. *Connectivity, toughness, spanning trees of bounded degrees, and spectrum of regular graphs*
Czechoslovak Mathematical Journal, 66, No. 3, 913–924, (2016) .
Special Issue dedicated to Miroslav Fiedler
With Xiaofeng Gu.

26. *Spectral bounds for the k-independence number of a graph*
Linear Algebra and its Applications, 510, 160–170, (2016).
With Aida Abiad and Michael Tait.

27. *Maximizing the order of a regular graph of given valency and second eigenvalue*
SIAM Journal of Discrete Math 30, 1509–1525, (2016).
With Jack Koolen, Hiroshi Nozaki and Jason Vermette.

28. *Notes on simplicial rook graphs*
Journal of Algebraic Combinatorics 43, 783–799, (2016).
Special Issue dedicated to Chris Godsil
With Andries Brouwer, Willem Haemers and Jason Vermette.

29. *Mixing rates of random walks with little backtracking*
CRM Proceedings Series, published by the American Mathematical Society as part of the **Contemporary Mathematics Series**, 655, 27–59, (2015).
With Peng Xu.

30. *A graph partition problem*
American Math. Monthly, 122, 972-982, (2015).
With Peter J. Cameron.

31. *The graphs with all but two eigenvalues equal to* ± 1
Journal of Algebraic Combinatorics, 41, 887–897, (2015).
With Willem Haemers, Jason Vermette and Wiseley Wong.

32. *The spectrum and toughness of regular graphs*
Discrete Applied Mathematics, 176, 43-52, (2014).
Special Issue for *Applications of Graph Spectra in Computer Science* Conference Centre de Recerca Matematica, Barcelona, Spain, June 16-20, 2012.
With Wiseley Wong.

33. *On the spectrum of the Wenger graphs*
Journal of Combinatorial Theory, Series B, 107, 132–139, (2014).
With Felix Lazebnik and Weiqiang Li.
Most Downloaded Paper in JCTB in 2014.

34. *The extendability of matchings in strongly regular graphs*
The Electronic Journal of Combinatorics, Volume 21, Issue 2, P2.34, (2014).
With Weiqiang Li.

35. *Disconnecting strongly regular graphs*
European Journal of Combinatorics, 38, 1–11, (2014).
With Jack Koolen and Weiqiang Li.

36. *On the connectedness of the complement of a ball in a distance-regular graph*
Journal of Algebraic Combinatorics, 38, 191–195, (2013).
With Jack Koolen.

37. *Variations on a theme of Graham and Pollak*
Discrete Mathematics, 313, 665-676, (2013).
With Michael Tait.

38. *Edge-disjoint spanning trees and eigenvalues of regular graphs*
Linear Algebra and its Applications, 437, 630–647, (2012).
With Wiseley Wong.

39. *Skew-adjacency matrices of graphs*
Linear Algebra and its Applications, 436, Issue 12, 4512–4529, (2012).
Special Issue on the occasion of the Workshop at the Banff International Research Station (BIRS): Theory and Applications of Matrices described by Patterns.
With Michael Cavers, Shaun Fallat, David Gregory, Willem Haemers, Steve Kirkland, Judy McDonald and Michael Tsatsomeros.

40. *On a conjecture of Brouwer involving the connectivity of strongly regular graphs*
Journal of Combinatorial Theory, Series A, 119, 904–922, (2012).
With Kijung Kim and Jack Koolen.

41. *Covering complete hypergraphs with cuts of minimal total size*
Graphs and Combinatorics, 28, Number 1, 109-122, (2012).
With André Kündgen.

42. *More counterexamples to the Alon-Saks-Seymour and the Rank-Coloring Conjectures*
The Electronic Journal of Combinatorics, P26, 1–9, (2011).
With Michael Tait.

43. *Covering complete r-graphs with spanning complete r-partite r-graphs*
Combinatorics, Probability and Computing, 20, 519–527, (2011).
With André Kündgen, Craig Timmons and Vladislav Vysotsky.

44. *Edge-connectivity, eigenvalues and matchings in regular graphs*
SIAM Journal of Discrete Mathematics, 24, 1470–1481, (2010).
With Suil O.
2nd most downloaded SIDMA Paper in November 2010; 3rd most downloaded SIDMA Paper in December 2010.

45. *A necessary and sufficient eigenvector condition for a graph to be bipartite*
Electronic Journal of Linear Algebra, 20, 351-353, (2010).

46. *A lower bound for the spectral radius of graphs with fixed diameter*
European Journal of Combinatorics, 31 (6), 1560-1566, (2010).
With Edwin van Dam, Jack Koolen and Jae-Ho Lee.

47. *Asymptotic results on the spectral radius and the diameter of graphs.*
Linear Algebra and its Applications, 432, 722-737, (2010).
With Edwin van Dam, Jack Koolen and Jae-Ho Lee.

48. *Eigenvalues and edge-connectivity of regular graphs*
Linear Algebra and its Applications, 432, 458-470, (2010).

49. *On decompositions of complete hypergraphs*
Journal of Combinatorial Theory, Series A, 116, 1232-1234, (2009).
With André Kündgen and Jacques Verstraëte.
Most Downloaded paper in JCTA between April 2009 and June 2009.

50. *Matchings in regular graphs from eigenvalues*
Journal of Combinatorial Theory, Series B, 99, 287-297, (2009).
With David Gregory and Willem Haemers.
Most Downloaded paper in JCTB between October 2008 and March 2009.

51. *Expander graphs and gaps between primes*
Forum Mathematicum, 20, Issue 4, 745-756, (2008).
With Ram Murty.

52. *The minimum degree distance of a graph with given order and size*
Discrete Applied Mathematics, 156, Issue 18, 3518-3521, (2008).
With Orest Bucicovschi.

53. *Zero forcing sets and the minimum rank of graphs*
Linear Algebra and its Applications, 428, Issue 7, 1628-1648, (2008).
AIM minimum rank - special graphs work group, with 18 co-authors.

54. *Spectral densest subgraph and independence number of a graph*
Journal of Universal Computer Science, 13, Issue 11, 1501-1513, (2007).
With Reid Andersen.

55. *Principal eigenvectors for irregular graphs*
Electronic Journal of Linear Algebra, 16, 366-379, (2007).
With David Gregory.

56. *The spectral radius and the maximum degree of irregular graphs*
The Electronic Journal of Combinatorics, 14, 1-10, (2007).

57. *Extreme eigenvalues of nonregular graphs*
Journal of Combinatorial Theory, Series B, 97, 483-486, (2007).
With David Gregory and Vladimir Nikiforov.

58. *Large matchings from eigenvalues*
Linear Algebra and its Applications, 422, 308-317, (2007).
With David Gregory.

59. *Sums of powers of the degrees of a graph*
Discrete Mathematics, 306 (16), 1959-1965, (2006).

60. *Eigenvalues of graphs and a simple proof of a theorem of Greenberg*
Linear Algebra and its Applications, 416 , 776-782, (2006).

61. *On the extreme eigenvalues of regular graphs*
Journal of Combinatorial Theory, Series B, 96 (3), 367-373, (2006).
3rd most downloaded paper in JCTB in April-June 2006 and October-December 2005.

62. *Closed walks and eigenvalues of Abelian Cayley graphs*
C.R.Acad.Sci.Paris Ser.I Math, Volume 342 (9), 635-638, (2006).
2nd most downloaded paper in Comptes Rendus in April-June 2006.

63. *Perfect matchings, eigenvalues and expansion*
C.R.Math.Rep.Acad.Sci.Canada, Vol. 27 (4), 101-104, (2005).

64. *Bounds on the Turán density of* $\mathbb{PG}(3,2)$
The Electronic Journal of Combinatorics, 11, 1-7, (2004).

Papers Submitted

1. *On the spectrum and linear programming bound for hypergraphs*
European Journal of Combinatorics, accepted pending revisions.
available at `https://arxiv.org/abs/2009.03022`.
With Jack Koolen, Masato Mimura, Hiroshi Nozaki and Takayuki Okuda.
2. *On the eigenvalues of Grassmann graphs, Bilinear forms graphs and Hermitian forms graphs*
Graphs and Combinatorics, accepted pending revisions.
available at `https://arxiv.org/abs/2102.10155`.
With Himanshu Gupta.
3. *Extremal graphs for a spectral inequality on edge-disjoint spanning trees*
submitted, available at `https://arxiv.org/abs/2104.01665`
With Anthony Ostuni, Davin Park, Sriya Potluri, Tanay Wakhare and Wiseley Wong.
4. *The least Euclidean distortion constant of a distance-regular graph*
submitted, available at `https://arxiv.org/abs/2109.09708`
With Himanshu Gupta and Ferdinand Ihringer.
5. *Triangle complexes of strongly regular graphs and their eigenvalues*
in preparation.
With Krystal Guo and Chunxu Ji.

Problems

1. Problem #11066, **American Mathematical Monthly**, 111, vol.2, p.166, (2004).

Students Supervision

- Graduate Students:

1. *Vishal Gupta, Ph.D. student 2021-present*
Vishal started working with me in Fall 2021 and is working on problems in spectral graph theory.
2. *Brandon Gilbert, Ph.D. student 2020-present*
Brandon started working with me in Fall 2020 and is working on problems on graph decompositions.
3. *Himanshu Gupta, Ph.D. student 2019-present*
Himanshu started working with me in Summer 2019 and is currently working on eigenvalues of graphs in association schemes.
4. *Dheer Noal Desai, Ph.D. student 2019-present*
Dheer started working with me in Fall 2019 and is working on problems in spectral graph theory.
5. **Paul Steller, M.Sc. Student, 2019-2020.**
Defended his M.Sc. Thesis successfully on May 8, 2019.
Thesis *A Survey of the Degree-Diameter Problem for Undirected Graphs*
Paul is a Software Engineer at Boaz Allen Hamilton.
6. **Matt McGinnis, Ph.D. student 2014-2018.**
Defended his Ph.D. Thesis successfully on March 22, 2018.
Ph.D. Thesis *Combinatorial and spectral properties of graphs and association schemes.*
Matt published one paper in *Linear Algebra and its Applications* and one paper to *Journal of Combinatorial Theory, Series B.*
Matt McGinnis is a Software Developer at Farragut Systems .

7. **Peng Xu (co-supervised with Mokshay Madiman), Ph.D. student 2014-2017.**
   Defended his Ph.D. Thesis successfully on March 20, 2017.
   Ph.D. Thesis *Some topics in random walks on graphs, harmonic analysis and Rogozin type inequalities for locally compact groups.*
   Peng has published one paper on random walks on graphs that appeared in the CRM Proceedings Series, published by the American Mathematical Society as part of the Contemporary Mathematics Series and several papers with Mokshay Madiman and James Melbourne in analysis, probability and information theory.
   Peng Xu is a Tenure-track Assistant Professor at Eastern Michigan University.
8. **Weiqiang Li, Ph.D. Student 2011-2015.**
   Defended his Ph.D. Thesis successfully on May 18, 2015.
   Ph.D. Thesis *Algebraic methods in graph theory.*
   Weiqiang published two papers in *European Journal of Combinatorics*, one paper in *Journal of Combinatorial Theory, Series B* and one paper in *The Electronic Journal of Combinatorics.*
   Weiqiang Li is a Senior Software Engineer at Google.
9. **Jason Vermette, Ph.D. Student 2011-2015.**
   Defended his Ph.D. Thesis successfully on April 23, 2015.
   Ph.D. Thesis *Spectral and combinatorial properties of friendship graphs, simplicial rook graphs and extremal expanders.*
   Jason published two papers in *Journal of Algebraic Combinatorics*, one paper in *SIAM Journal of Discrete Mathematics* and one paper in in *Designs, Codes and Cryptography.*
   Jason Vermette is an Assistant Professor at Missouri Baptist University in St. Louis.
10. **Wiseley Wong, Ph.D. Student, 2010-2013.**
    Defended his Ph.D. Thesis successfully on March 12, 2013.
    Ph.D. Thesis *Spanning trees, toughness and eigenvalues of regular graphs*
    Wiseley published one paper in *Linear Algebra and its Applications*, one paper in *Discrete Applied Mathematics*, and one paper in *Journal of Algebraic Combinatorics.*
    Wiseley Wong is a Lecturer at the University of Maryland.
11. **Michael Tait, M.Sc. Student, 2010-2011.**
    Defended his M.Sc. Thesis successfully on April 20, 2011.
    M.Sc. Thesis *The Alon-Saks-Seymour and Rank-Coloring Conjectures*
    Based on his M.Sc. Thesis, Michael published one paper in *The Electronic Journal of Combinatorics* and one paper in *Discrete Mathematics.*
    Michael Tait did a Ph.D. in Combinatorics at the University of California, San Diego, working with Jacques Verstraëte, was an NSF postdoc at Carnegie Mellon and is now Tenure-track Assistant Professor at Villanova University.

- Undergraduate/High School Research

1. Danielle Henry (University of Delaware Summer Scholar 2021) - Danielle studied spectral characterization of graphs.
2. Alex You (University of Delaware Summer Scholar 2021) - Alex studied the properties of flip graphs and signed reversal graphs.
3. Brandon Gilbert (University of Delaware, Math undergrad, Senior Thesis 2020) - Brandon has written and defended successfully his Senior Thesis on optimal addressings of graphs.

4. Zhao Kuang Tan (Nanyang Technological University, visiting undergrad student July-December 2019) - Zhao has been working with me studying flip graphs on perfect matchings.
5. Brandon Gilbert (University of Delaware Summer Scholar 2019) - Brandon is working on some problems in spectral graph theory.
6. Chunxu Ji (University of Delaware, Math undergrad, Senior Thesis 2019) - Chunxu has written and defended successfully his Senior Thesis on eigenvalues of simplicial complexes.
7. Brandon Gilbert (University of Delaware Summer Scholar 2018) - Brandon has continued his research from earlier in the year investigating addressings of Johnson graphs, odd cycles and complete multipartite graphs.
8. Chunxu Ji (University of Delaware Summer Scholar 2018) - Chunxu has been working on eigenvalues of hypergraphs and investigated whether or not the eigenvalues of clique complexes distinguish non-isomorphic but cospectral strongly regular graphs.
9. Gifan Thadathil (University of Delaware, Computer Science undergraduate, Senior Thesis 2018) - Gifan has written and defended successfully his Senior Thesis on spectral sparsification of graphs.
10. Brandon Gilbert (independent research work since Fall 2017) - Brandon has been working with me on research problems related to graph decompositions into bicliques and addressing graphs.
11. Abhinav Ratnagiri (Charter School of Wilmington, Summer 2017) - Abhinav contacted me and sat in some of my research meetings with Chunxu Ji and Joseph Buxton.
12. Joseph Buxton (University of Delaware Summer Scholar 2017) - Joseph studied graphs defined by systems of equations and investigated the girth of the graphs $D(k, 3)$.
13. Chunxu Ji (University of Delaware Scholar 2017) - Chunxu studied the chromatic index of graphs.
14. Stephanie Clampitt (University of Delaware Summer Scholar 2016) - Stephanie worked on the applications of the top trading cycle algorithm of Scarf and Shapley to kidney donation exchanges.
15. Cory Cutsail (McNail Scholar 2016) - Cory worked on the applications of the deference algorithm and the top trading cycle algorithm to school choice mechanisms.
16. Nicole DiPasquale (University of Delaware Summer Scholar 2016) - Nicole worked with Muge Capan (Value Institute, Christiana Hospital) on the applications of spectral clustering to identifying, understanding and detecting the early warning signs of deteriorating patients. Nicole works at Merck.
17. Pasquale Zingo (University of Delaware Summer Fellow 2016) - Pasquale worked on q-addressing of cycles and other graphs.
18. Adhitya Dattatri - (Charter School of Wilmington, Summer 2015) - Adithya worked with me on graph theory and linear algebra. Adithya was accepted in the MIT Primes program and has started at Princeton in Fall 2017 an undergraduate degree in computer science.
19. Yi Zhang (University of Delaware Summer Scholar 2015) - *Connectivity of Association Schemes* Yi worked with me and Yingnan Zhang on the Godsil conjecture that the edge-connectivity of distance-i graphs of a primitive distance-regular graph equals its valency.

20. Briana Lamet (University of Delaware Summer Scholar 2015) - *Intersecting Families of Triangulations* Briana worked with me and Jimin Kim on Kalai's recent conjecture on the maximum number of intersecting triangulations of a convex polygon. Briana is working for Teach for America.

21. Yi Zhang (University of Delaware Summer Scholar 2014 - *Constructing Expander Graphs using Signed Adjacency Matrices*). Yi worked with me and Matt McGinnis investigating the recent work of Marcus, Spielman and Srivastava proving the existence of bipartite Ramanujan graphs for every valency. Yi is doing a Masters in the Department of Statistics at UD.

22. Emma Kulek (University of Delaware Summer Scholar 2014 - *The Mathematics and Economics of Matchings*). Emma worked with me on various extensions and applications of the Gale-Shapley algorithm to school matching between high-schools and students in NYC and Boston. Emma works for JP Morgan Chase.

23. Alexandra Sampugnaro (University of Delaware Summer Fellows 2013 - *Quantum Computing and Algebraic Graph Theory*). Alexandra worked with me and Sarah Cates on algebraic graph theory and quantum computing. Alexandra works for Chubb.

24. Michelle Markiewitz (University of Delaware Summer Scholar 2012 - *Network Addressing using Biclique Graph Decomposition*). Michelle worked with me on biclique decomposition of graphs and network addressing. Based on our work, Michelle was awarded the Wolfe Undergraduate Prize [1] in 2013 by the Department of Mathematical Sciences at the University of Delaware. Michelle was accepted into the Summer Scholar Program in 2013 to continue her research with me in Summer 2013, but she was also accepted into the NSA Summer Director's Program and she spent the Summer 2013 at NSA. Michelle currently works at NSA.

25. Dajun Lin (University of Delaware Summer Scholar 2011 - *Cospectral Graphs*). Dajun worked with me and Jason Vermette studying constructions of cospectral mates for the Kneser graphs using Godsil-McKay switching. Dajun was awarded the Wolfe Undergraduate Prize [1] in 2011 and the Clark Undergraduate Prize [2] in 2012 by the Department of Mathematical Sciences at the University of Delaware. Dajun did a Ph.D. in Economics at University of Virginia and is now a researcher at the American Institute for Research.

26. Patrick Devlin (University of Delaware Summer Scholar 2010 - *The Degree-Diameter Problem*). Patrick worked with me and Mary Korch on the degree-diameter problem for graphs. Patrick Devlin was awarded the Wolfe Undergraduate Prize [1] in 2010 by the Department of Mathematical Sciences at the University of Delaware. Patrick did Ph.D. in Discrete Mathematics at Rutgers and is now Gibbs Assistant Professor at Yale University.

27. Michael Tait 2010 *Graph Decomposition into Bicliques.*
Michael worked with me studying biclique decomposition of graphs and their relations to problems in computer science. Michael Tait was awarded the Wolfe Undergraduate Prize [1] in 2009 and the Clark Undergraduate Prize [2] in 2010 by the Department of Mathematical Science at the University of Delaware. In academic year 2010-2011, wrote a M.Sc. Thesis and finished

[1] Awarded to a student entering the senior year majoring in mathematics who has demonstrated both love and talent for the subject, qualities personified by Professor Wolfe. Amount of the scholarship is dictated by the Financial Aid officer and is dependent on revenue income. Selection of recipient is made by the Undergraduate Committee and approved by the Director of Undergraduate Studies.

[2] A cash award presented only when a senior majoring in mathematics has, in the opinion of the Department, unusual ability in the area. Selection of recipient is determined by the Undergraduate Committee and approved by Director of Undergraduate Studies.

his M.Sc. degree under my supervision. Michael did Ph.D. in Discrete Mathematics at UC San Diego, was an NSF PostDoctoral Fellow at Carnegie Mellon University and is now a tenure-track Assistant Professor at Villanova.

- Graduate Summer Research:

  1. Vishal Gupta (Gems 2021)
     Vishal studied flip graphs and signed reversal graphs.
  2. Mutasim Mim (Gems 2021)
     Mutasim studied spectral characterization of graphs.
  3. Brandon Gilbert (Unidel 2021)
     Brandon studied graph addressing problems.
  4. Himanshu Gupta (Gems 2019)
     Himanshu studied eigenvalues of association schemes.
  5. Anderson Gomes da Silva (Unidel 2019)
     Anderson studied edge colorings of graphs.
  6. Tianxiao Zhao (Gems 2017)
     Tianxiao studied graphs defined from systems of equations over finite fields.
  7. Yingnan Zhang (Gems 2015)
     Yingnan worked on connectivity of association schemes.
  8. Jimin Kim (Gems 2015)
     Jimin worked on various Erdös-Ko-Rado type problems in extremal combinatorics.
  9. Lorinda Leshock (Unidel 2015)
     Lorinda worked on quantum computing and algebraic graph theory.
  10. Hanlin Zou (Unidel 2015)
      Hanlin worked on spectral hypergraph theory.
  11. Matt McGinnis (Gems 2014)
      Matt worked on a project in spectral graph theory investigating the recent work of Marcus, Spielman and Srivastava involving the existence of bipartite Ramanujan graphs for every valency.
  12. Brian Kolarovic (Unidel 2014)
      Brian worked on a project in quantum computing.
  13. Sarah Cates (Gems/Gaann 2013)
      Sarah worked on a project on quantum computing and algebraic graph theory. She investigated perfect state transfer on graphs.
  14. Kenneth Boyle (Unidel 2012)
      Ken worked on a project on vertex-transitive graphs. He investigated the connectivity properties of such graphs.
  15. Jason Vermette (Gems 2011)
      Jason worked on a project studying graphs that are determined by their eigenvalues. He studied the Kneser graphs and graphs having the same eigenvalues as Kneser graphs.
  16. Michael Tait (Unidel 2011)
      Michael worked on decomposition problem of Zaks that was later studied by Alan Hoffman. Michael slightly improved Hoffman's results regarding the minimum number of bicliques needed to decompose the honeymoon motel graph.

17. Mary Ann Korch (Gems 2010)
    Mary worked on the degree-diameter problem. She investigated algebraic techniques using eigenvalues that are used to show the impossibility of constructing graphs within a small additive term from the Moore bound.
18. Giovanna Fiorentino (Unidel 2010)
    Giovanna studied eigenvalues of Laplacian matrices including the recent proof of the Grone-Merris Conjecture and a related conjecture of Brouwer.
19. Fatih Say (Unidel 2010)
    Fatih studied graphs that are determined by their eigenvalues and surveyed some of techniques that are used in this area.

- Ph.D. Examiner:

1. Bradley Fain (University of Delaware; supervisor: Robert Coulter, July 2021).
2. Melissa Fuentes (University of Delaware; supervisor: Felix Lazebnik, April 2021).
3. Kris Hollingsworth (University of Delaware; supervisor: Mahya Ghandehari and Dominique Guillot, August 2020).
4. Emily Bergman (University of Delaware; supervisor: Robert Coulter, July 2020).
5. Anu Varghese (Cochin University of Science and Technology, India; supervisor: Ambat Vijayakumar, May 2020).
6. Xiaohong Zhang (University of Manitoba, Canada; supervisor: Steve Kirkland, August 2019).
7. Alejandro Parada (University of Delaware ECE Dept.; supervisor: Gonzalo Arce, July 2019).
8. Harmony Zhan (University of Waterloo; supervisor: Chris Godsil; September 2018)
9. Shuying Sun (University of Delaware; supervisors: Naya Bhatnagar and Felix Lazebnik; 2017)
10. Rafael Plaza (University of Delaware; supervisor: Qing Xiang; 2016)
11. James Alexander (University of Delaware; supervisor: Felix Lazebnik; 2016)
12. Aida Abiad (Tilburg University, The Netherlands; supervisor: Willem Haemers; 2015)
13. Aleksandr Kodess (University of Delaware; supervisor: Felix Lazebnik; 2014).
14. Fan Wu (University of Delaware; supervisor: Qing Xiang; 2013).
15. Salma Kanwal (Lahore University, Pakistan; supervisor: Ioan Tomescu; 2012).
16. Michael Cavers (University of Regina, Canada; supervisors: Steve Kirkland and Shaun Fallat; 2010).

- Visiting Researchers Supervision/Host:

1. Celso Marquez da Silva jr. (Centro Federal de Educao Tecnolgica Celso Suckow da Fonseca, Maracana, Brazil) September 2018-February 2019 (6 months).
2. Sezer Sorgun (Nevsehir Haci Bektas Veli University, Turkey), Associate Professor, August 24, 2018 (6 months).

3. Li Zhang (Shanghai Finance University, China), Associate Professor, February 3, 2017- January 31, 2018.
4. Lihuan Mao (Xi'an Jiaotong University, China), Ph.D. student of Wei Wang, September 2017-August 2018.
5. Zhen Li (Tongjii University, China), Ph.D. student of Yusheng Li , June-August 2014.
6. Hyeonju Yu (POSTECH, South Korea), Ph.D. student of Jack Koolen, June 18-July 1, 2011.

- Member of the Ph.D. Candidacy Exam Committee for 25 students:

1. Wiseley Wong
2. Fan Wu
3. Alex Kodess
4. Weiqiang Li
5. Chris Castillo
6. Jason Vermette
7. Rafael Plaza
8. James Alexander
9. Shuying Sun
10. Patrick Cesarz
11. Paul Hearding
12. Matt McGinnis
13. Yingnan Zhang
14. Hanlin Zou
15. Mingchang Ding
16. Lorinda Leshock
17. Kris Hollingsworth
18. Li-An Chen
19. Bradley Fain
20. Abhijit Baruat
21. Dheer Desai
22. Vlad Taranchuk
23. Kamal Joshi
24. Himanshu Gupta
25. Jerome Roehm

ORGANIZER

Organizer Discrete Mathematics/Algebra Seminar at University of Delaware.
University of Delaware, Spring 2009-Spring 2013, Fall 2014-present.
With Novi Bong.

Organizer AIM Workshop *Spectral hypergraph theory:connections and applications*
December 6-10, 2021, `https://aimath.org/workshops/upcoming/`
With Krystal Guo and Nikhil Srivastava.

Organizer Mini-symposium *Spectral Graph Theory*
SIAM Discrete Math Conference 2021, July 20-23, 2021
https://www.siam.org/conferences/cm/conference/dm21

Organizer CanaDAM Mini-symposium *Spectral Graph Theory*
May 25-28, 2021, https://2021.canadam.math.ca/
With Michael Tait.

Organizer Mini-symposium *Spectral Graph Theory*
ILAS 2019 *Linear Algebra Without Borders* Conference http://ilas2019.org/, Rio de Janeiro, July 8-12, 2019.
With Jack Koolen and Leonardo Lima.

Organizer AMS Special Session *Recent Progress in Algebraic Graph Theory*
University of Hawaii at Manoa, Honolulu, March 22-24, 2019.
With Shaun Fallat.

Organizer AMS Special Session *Graph Theory*
University of Delaware, September 29-30, 2018.
With Brian Kronenthal, Felix Lazebnik and Tony Wong.

Organizer Mini-symposium *Linear Algebra Methods in Combinatorics*
SIAM Discrete Mathematics Conference, University of Denver, June 4-8, 2018.
With Michael Tait.

Organizer AMS Special Session *Extremal Graph Theory and Quantum Walks on Graphs*
Northeastern University, April 21-22, 2018.
With Mark Kempton, Gabor Lippner and Michael Tait.

Organizer *Algebraic and Extremal Graph Theory Conference.*
University of Delaware, August 7-10, 2017.
www.mathsci.udel.edu/aegt
With Robert Coulter, Gene Fiorini and Qing Xiang.

Organizer, 2nd Toyota-UD Applied Math Initiative Workshop for High School Teachers.
University of Delaware, June 22-25, 2015.
http://www.udel.edu/udaily/2015/jun/math-workshop-062515.html
With Chris Raymond and Rakesh.

Organizer, 1st Toyota-UD Applied Math Initiative Workshop for High School Teachers.
University of Delaware, July 21-24, 2014.
http://www.udel.edu/udaily/2015/jul/real-world-math-072514.html

Organizer *Conference on Graph Theory, Matrix Theory and Interactions*
A Conference to celebrate the Scholarship of David Gregory
June 20-21, 2014, Queen's University at Kingston, Canada.
With Ram Murty, Bryan Shader, Claude Tardif, Kevin Vander Meulen and David Wehlau.
http://www.fields.utoronto.ca/programs/scientific/13-14/interactions/

Organizer Special Session *Discrete Mathematics and Theoretical Computer Science*
Joint American Math Society and Romanian Math Society Meeting, June 27-30, 2013, Alba Iulia, Romania.
With Gabriel Istrate, Ioan Tomescu and Marius Zimand.

Founder and Organizer of The Summer Student Combinatorics Seminar.
University of Delaware, Summer 2011, 2012.

Organizer Mini-symposium on Algebraic Graph Theory.
2nd CanaDAM Conference, Montreal, Canada, May 25-29, 2009.
With Mike Newman.

Organizer Mini-symposium on Eigenvalues of Graphs.
SIAM Discrete Mathematics Conference, University of Vermont, June 15-19, 2008.
With Vladimir Nikiforov.

Organizer of a Graph Theory Session, CMS Winter Meeting.
University of Western Ontario, London, Canada, December 8-10, 2007.
With Steve Kirkland and Claude Tardif.

Organizer of a Mini-Symposium in Spectral Graph Theory.
1st CanaDAM Conference, Banff, Alberta, Canada, May 28-31, 2007.
With Steve Kirkland.

Organizer of a Special Session in Graph Theory and Combinatorics.
AMS Meeting #1027, Tucson, Arizona, April 21-22, 2007.
With Joshua Cooper.

Organizer of a Reading Course *Harmonic Analysis in Combinatorics and Additive Number Theory*, University of California, San Diego Fall 2006.
With Ross Richardson.

Organizer of the UCSD Combinatorics Seminar, Summer 2006.

Organizer of the 13th Ontario Combinatorics Workshop in 2004.
With David Gregory, Lucien Haddad, Claude Tardif and David Wehlau.

Awards, Honors, Grants

2019 JSPS Invitational Fellowship for Research in Japan during the First Recruitment for Short Term *Japan Society for the Promotion of Science (JSPS) carries out programs that provide overseas researchers who have an excellent record of research achievements with an opportunity to conduct collaborative research, discussions, and opinion exchanges with researchers in Japan.* This grant will support my 60 days visit to Japan to conduct research with my collaborator, Hiroshi Nozaki, at Aichii University of Education and other researchers at Tohoku University, Kyoto University, Hiroshima Institute of Technology and University of Tsukuba.

2019 Nominated for Excellence in Research in the College of Arts and Sciences at University of Delaware.

2018-2022 Co-PI on NSF collaborative proposal 1816003/1815992 CIF: Small: Collaborative Research: Blue-Noise Graph Sampling ($300,000 USD; PI: Gonzalo Arce (ECE, University of Delaware)).

2018 Nominated for Excellence in Teaching in the College of Arts and Sciences at University of Delaware.

2018 UD Career Services Center Faculty & Staff Career Innovation Grant ($2,500 USD) for a project *Research and Innovation in Mathematical Sciences* involving a visit to UD of Po-Shen Loh, Associate Professor at Carnegie Mellon, Coach of US International

Math Olympiad Team and founder of `expii.com` *The Personal Learning Revolution.*

2017 UD Center for Teaching and Assessment of Learning (CTAL) grant ($4,000 USD) to develop an open textbook in discrete mathematics with Robert Coulter.

2016 PI on NSF DMS Grant 1649807 Algebraic and Extremal Graph Theory Conference ($ 23,000 USD) (with co-PIs: Robert Coulter, Gene Fiorini and Qing Xiang). This grant provided funding to organize a conference on Algebraic and Extremal Graph Theory between August 7 and 10, 2017 at the University of Delaware in Newark, DE.

2016-2020 PI on NSF DMS Grant 1600768 *The Interplay between Spectral and Combinatorial Properties of Graphs and Association Schemes* ($130,000 USD). This 3-year grant will support my research in spectral graph theory and algebraic combinatorics.

2016 NSA Young Investigator Award Grant ($40,000 USD)
This award is given to promising investigators within ten years after receiving their Ph.D. Research proposals are reviewed at NSA and/or by a Mathematics Review Panel appointed by the American Mathematical Society.

2016 Simons Foundation Collaboration Grant ($35,000 USD)
A selection committee of distinguished scientists will consider the proposals. Awards will be based on the quality of the applicant's previous research and the likely impact that a grant for collaboration and travel would have on future research, both for the applicant and the applicant's students and/or postdocs.

2015 Visiting Scholar Grant *Initiative d'Excellence de l'université de Bordeaux* (IdEx Bordeaux) to visit Christine Bachoc for 1 month at *Institut de Mathématiques* at *Université de Bordeaux* in summer 2016. (+5,000 euros).

2014 UD Center for Teaching and Assessment of Learning (CTAL) grant ($12,000 USD) to develop and teach an experimental interdisciplinary course Math/Eleg 467 *Mathematics and Technology* with Charles Boncelet (Electrical Engineering).

2013 NSA Young Investigator Award Grant ($40,000 USD).
This award is given to promising investigators within ten years after receiving their Ph.D. Research proposals are reviewed at NSA and/or by a Mathematics Review Panel appointed by the American Mathematical Society.

2011 Nominated for Alison Society's Young Scholar Award at University of Delaware. The purpose of the award is to recognize promising young scholars at the University and encourage their future development of research at the University.

2011 Nominated for Excellence in Teaching at University of Delaware.

2011 Simons Foundation Collaboration Grant ($35,000 USD).
A selection committee of distinguished scientists will consider the proposals. Awards will be based on the quality of the applicant's previous research and the likely impact that a grant for collaboration and travel would have on future research, both for the applicant and the applicant's students and/or postdocs.

2006 NSERC Postdoctoral Fellowship ($80,000 CDN).
Awarded by the National Sciences and Engineering Research Council of Canada in recognition of academic excellence, research ability and potential, and leadership and communication skills.

2005 Ontario Graduate Scholarship as international student ($15,000 CDN).
Competition is open to all research areas and only a percentage of 0.03% is awarded to international students.

Referee

Reviewer for AMS MathSciNet (reviewed 4 books and 61 research papers)
Reviewer for Zentralblatt Math (reviewed 11 papers)
Reviewer of NSA Grant Proposal in 2013
Reviewer of King Fahd University, Saudi Arabia Grant Proposal in 2012
Reviewer of ORAU Grant Proposal in 2011
Reviewer for 2 books TRIM Series Hindustan Book Agency, India
Reviewer for 2 books for ILAS IMAGE in 2014
Reviewer for IEEE ITW 2016
Reviewer for FWO Flanders Grant Proposal in 2016
Reviewer for NSERC Grant Proposal in 2015
Reviewer for NSERC Grant Proposal in 2014
Reviewer of FONDECYT Grant Proposal (Chile) in 2013, 2016 and 2018.
Reviewer for 1 book for Wiley 2017
Reviewer proposal Czech Science Foundation in 2021
and referee for
Advances in Combinatorics
Algorithmica
Applicable Analysis and Discrete Mathematics
Applied Discrete Mathematics
Applied Mathematics and Computation
Ars Combinatoria
Australasian Journal of Combinatorics
Bull. Math. Soc. Sci. Math. Roumanie (N.S.)
Combinatorica
Computational and Applied Mathematics
Computers and Mathematics with Applications
Discrete Applied Mathematics
Discrete Mathematics
Discrete Mathematics and Theoretical Computer Science
Discrete Optimization
Discussiones Mathematicae Graph Theory
Electronic Journal of Combinatorics
Electronic Journal of Linear Algebra
European Journal of Combinatorics
Experimental Mathematics
FILOMAT
Graphs and Combinatorics
IEEE Transactions Information Theory
Journal of Algebraic Combinatorics
Journal of Algebra, Number Theory and Applications
Journal of Combinatorial Optimization
Journal of Combinatorial Theory, Series A
Journal of Combinatorial Theory, Series B
Journal of Discrete Algorithms
Journal of Graph Theory ($\geq$ 10 papers)
Journal of Inequalities in Pure and Applied Mathematics
Journal of Ramanujan Math Society
Linear Algebra and Its Applications
Linear and Multilinear Algebra Information Processing Letters
International Journal of Mathematics and Mathematical Sciences

International Journal of Number Theory
Internet Mathematics dedicated to WAW2011
LAGOS13 and 15
Random Structures and Algorithms
Rocky Mountain Journal of Mathematics
SIAM Journal of Discrete Mathematics
SIAM Journal on Matrix Analysis and Applications
SIAM Review
SODA 2012
Utilitas Mathematica
Vietnam Journal of Mathematics
Transactions of Combinatorics

Research Visits

Hiroshima Institute of Technology, Japan
December 19-December 23, 2019.
Host: Tetsuji Taniguchi.

Tohoku University, Japan
December 2-December 8, 2019
Hosts: Akihiro Munemasa and Hajime Tanaka.

Aichii University, Japan
November 2019-January 2020
Host: Hiroshi Nozaki.

Anhui University, Hefei, China
November 13-29, 2018.
Host: Yi-Zheng Fan.

Shandong University of Technology, Zibo, China
May 28-June 3, 2018.
Host: Jianfeng Wang

Beijing Jiaotong University, Beijing China
June 2017.
Host: Yan-Quan Feng

Central South University, Changsha, China
November 2016.
Host: Lihua Feng.

University of Science and Technology, Hefei, China
October 2016.
Host: Jack Koolen.

Tianjin University, China
October 2016.
Host: Xing Peng.

Institut de Mathématiques, Bordeaux, France
June-July 2016.
Host: Christine Bachoc.

Universidade Federal do Rio de Janeiro (UFRJ)

Programa de Engenharia de Produo, November 2015.
Host: Nair Abreu.

Xi'an Jiaotong University, China.
Department of Mathematics, September 2015.
Host: Wei Wang.

Shanghai Jiaotong University, China.
Department of Mathematics, September 2015.
Host: Xiaodong Zhang.

University of Waterloo, Canada.
Department of Combinatorics and Optimization, August 2013.
Host: Chris Godsil

Research Experience for Graduate Students (REGS) Program.
University of Illinois at Urbana-Champaign, USA, July 2011.
Host: Douglas West.

Microsoft Research Theory.
Redmond, Washington, USA, May 2011.
Host: Alexandra Kolla.

Department of Mathematics.
University of Malta, Malta, May 2011.
Host: Irene Sciriha.

Department of Mathematics.
University of California, San Diego, April 2011.
Host: Jacques Verstraete.

Department of Mathematics.
Pohang Institute of Technology (POSTECH), South Korea, December 2009.
Host: Jack Koolen.

Department of Econometrics and Operations Research.
Tilburg University, The Netherlands, September 2007.
Hosts: Edwin van Dam and Willem Haemers.

Outreach Activities

Coach (with Mahya Ghandehari) of UD Putnam Team in 2017-2018, 2018-2019, 2021-2022.

Member of *Avon Grove Education Foundation* 2018-2019.

Joint Math Meeting AMS-MAA January 10-13, 2018.
Volunteer Judge for the Undergraduate Poster Session.

UD Math Club, September 9, 2016.
Presentation on combinatorics, coding theory and networks.

University of Delaware Interdisciplinary Science Learning Laboratories Lecture Series, September 22, 2014.

UD Math Club, September 5, 2014.

Presentation on combinatorics, coding theory and networks.

UD Math Circle, December 7, 2013.
Presentation on 4-color map theorem, planar graphs and guarding art galleries.

UD Math Club, September 6, 2013.
Presentation on coding theory, graph theory (Gale-Shapley algorithm) and geometry.

UD Math Club, February 22, 2013.
Presentation discussing graph theory from Euler to present time.

MathCounts Enrichment Program University of Delaware, January 25 2013.
Three Presentations discussing graph theory, Eulerian tours and coloring.

Nobel Symposium, University of Delaware, October 24, 2012
Presentation about Lloyd Shapley, Nobel Prize Winner in Economics in 2012.

UD Math Circle, October 20, 2012
Presentation about graph theory, guarding art galleries and coloring problems.

Coach of University of Delaware Putnam Team for Putnam contest 2009.
With David Bellamy.

Queen's University, May 2005, Instructor $E = mc^2$ Enrichment Program for high school students; designed and taught two one-week courses *Cryptography and Computers*.

Coach of Queen's Undergraduate Team for Putnam contest 2004.
With Michael Roth and Ivan Dimitrov.

Research Talks

2021

161. Nanyang Technological University SPSS/MAS Colloquium via Zoom, September 29/30, 2021.
`https://costalks.ntu.edu.sg//SolvtifyAPI/Seminar/View?id=3552`
160. Indiana University Purdue University Indianapolis, Math Colloquium, September 17, 2021.
159. Fields Institute Workshop *Algebraic Graph Theory and Quantum Information* **invited talk**, August 24, available online at
`https://www.youtube.com/watch?v=PpgcmplZOlg`
158. MAA-Fest, **invited talk** in the *Eigenvalues and Graphs* Session, August 5, online.
157. Romanian Algorithms Days, June 7-8, 2021 **invited talk** via Google Meet `https://sites.google.com/view/zilelealgoritmiceromanesti/home`.
156. SIAM Linear Algebra Conference via Zoom, **invited talk** in the Minisymposium on Spectral Graph Theory, May 21, 2021.
155. *Open Problems in Algebraic Combinatorics*, organized by Chris Godsil and his students at University of Waterloo, **Invited speaker**
`https://www.math.uwaterloo.ca/ cgodsil/quagmire/may21workshop/`
154. *Spectral Graph Theory Online 2021*, organized by the spectral graph theory groups in Rio de Janeiro and Porto Alegre, Brazil, April 28-29, 2021
`http://spectralgraphtheory.org/sgt-online/` **Invited speaker**.
153. Workshop *Teoria Espectral de Grafos*, Universidade Federal de Parana, Brazil, February 1 via Zoom `https://www.youtube.com/watch?v=YAfs8GFhU88`
152. University of South Carolina, Discrete Mathematics Seminar, January 22, 2021
`https://www.youtube.com/watch?v=hH5-IQv5pPQ`

2020

151. International Number Theory and Discrete Mathematics Conference honoring 100 years from Ramanujan's birth, Ramanujan Mathematical Society and Rajagiri School of Engineering, Cochi, India `http://www.rajagiritech.ac.in/icntdm/`, December 13, 2020 **Invited speaker** via Zoom.
150. West Chester University, Department of Mathematics Colloquium, December 2, 2020, `https://www.wcupa.edu/sciences-mathematics/mathematics/colloquium.aspx`
149. AMS Fall Western Virtual Section Meeting, Special Session *Graphs and Matrices* invited talk via Zoom, October 25, 2020.
148. The 2nd International Conference on Lesson Study of Science, Technology, Engineering, and Mathematics, University of Jember, Indonesia `http://icolsstem.fkip.unej.ac.id/conference-schedule/`, September 19-20, 2020 **Keynote talk** via Zoom.
147. Baltimore Number Theory and Combinatorics Seminar via Zoom, July 31st, 2020.
146. University of Waterloo Algebraic Graph Theory Seminar via Zoom, July 13, 2020.
145. ICERM Workshop Circle Packings and Geometric Rigidity, *Rigidity, associahedron graph and eigenvalues* **Invited talk** 45 minutes via Zoom on July 9, 2020.
144. SIAM UD Math Chapter – 3 Zoom Lectures (April 10,17,24, 2020) on Linear Programming and Semidefinite Programming in Combinatorial Optimization
143. UC Berkeley Combinatorics Seminar, March 4, 2020.
142. Joint Workshop on Algebraic Combinatorics and Cryptography, University of Tsukuba, Japan `https://sites.google.com/view/accrypto/` **Plenary speaker**.

2019

141. Hiroshima Institute of Technology Combinatorics Seminar, December 20, 2019.
140. Research Institute for Mathematical Sciences Workshop *Algebraic Combinatorics, Related Groups and Algebras*, Kyoto University, Japan, December 16-19, 2019 `https://hnozaki.jimdofree.com/conference/rims2019/` **Invited Speaker.**
139. Sendai Workshop in Combinatorics, Tohoku University, Japan, December 4, 2019 `http://yirie.info/events/swoc19/` **Plenary Speaker.**
138. Nagoya Combinatorics Seminar, Nagoya, Japan, November 29, 2019.
137. Brigham Young University Combinatorics Seminar, September 27, 2019.
136. Muhlenberg College Colloquium Series, September 20, 2019.
135. ILAS 2019 *Linear Algebra Without Borders* Conference `http://ilas2019.org/`, Rio de Janeiro, July 8-12, 2019, contributed talks in the *Spectral Graph Theory* and *Combinatorial Matrix Theory* Sessions.
134. X Lagos (Latin & American Algorithms, Graphs and Optimization Symposium), Belo Horizonte, Brazil, June 2-7, 2019 `http://www.lagos2019.dcc.ufmg.br/` **Plenary Speaker**.
133. TU Delft Colloquium, May 27, 2019.
132. ACO Seminar, Carnegie Mellon University, April 18, 2019.
131. AMS Meeting University of Hawaii, Manoa, Special Session *Recent Trends in Algebraic Graph Theory*, March 22, 2019.
130. University of Hawaii at Manoa, Applied Math. Seminar, Honolulu, March 20, 2019.
129. Norbert Wiener Center Seminar, University of Maryland, February 12, 2019.

2018

128. Princeton Discrete Mathematics Seminar, December 13, 2018.
127. International Workshop *Algebraic Combinatorics*, Anhui University, China `http://ahumath.ahu.cn/` **Plenary Speaker**, November 22-25, 2018.
126. MIT Combinatorics Seminar, November 2, 2018.
125. University of Wisconsin at Madison Combinatorics Seminar, October 28, 2018.
124. Ohio State Combinatorics and Probability Seminar, October 4, 2018.
123. Workshop on Algebraic Graph Theory and Complex Networks, Naples, Italy `http://www.dma.unina.it/ocsuser/ocs/index.php/WAGTCN/2018`

September 13-14, 2018 **Plenary Speaker**.
122. Tutte Seminar, University of Waterloo, September 2018.
I 122. Graphs and Groups, Representations and Relations (G2R2) Conference, Akademgorodok, Novosibirsk, Russia
`http://math.nsc.ru/conference/g2/g2r2/` August 6-19, 2018 **Plenary Speaker**. Invited, but I canceled my participation as I broke my collarbone on June 24, 2018.
121. 2018 International Workshop on Algebraic Graph Theory and Applications, Shandong University of Technology, Zibo, China, June 1-3, 2018. **Plenary Speaker**
120. Rutgers Discrete Mathematics Seminar, April 30, 2018.
119. Virginia Commonwealth University Combinatorics Seminar, April 18, 2018.
118. University of West Georgia Colloquium, April 6, 2018.
117. George Washington University Combinatorics Seminar, April 3, 2018.
116. Middle Tennessee State University Colloquium, March 16, 2018.
115. University of Delaware, Discrete Math Seminar.

2017

114. Rice Computational and Applied Mathematics Colloquium, November 6, 2017.
113. Clarkson University David A. Walsh '67 Arts and Sciences Seminar Series.
112. International Linear Algebra Society Conference, *Spectral Graph Theory* Session, Iowa State University.
111. Tsinghua University, Combinatorics Seminar, China, June 23, 2017.
110. Beijing Jiaotong University, Combinatorics Seminar, China, June 22, 2017.
109. WPI Colloquium Talk, Worcester, March 3, 2017.
108. MIT Combinatorics Seminar, March 1st, 2017.
107. University of Miami Combinatorics Seminar, February 18 2017.

2016

106. US Naval Academy, Annapolis, Colloquium Talk.
105. Central South University, Changsha, China, Combinatorics Seminar.
104. University of Science and Technology, Hefei, China, Combinatorics Seminar.
103. International Workshop on Algebraic Combinatorics, Anhui University, China.
102. Tianjin University, Center for Applied Mathematics, Tianjin, China, Combinatorics Seminar.
101. *LaBRI* Combinatoire Algebrique and Enumerative, Bordeaux, France.
100. *LaBRI* (Laboratoire Bordelais de Recherche en Informatique) Graphes et Optimisation Seminaire, Bordeaux, France.
99. *New Directions in Combinatorics* Workshop, Institute of Mathematical Sciences, National University of Singapore, Singapore.
98. Gettysburg College Colloquium.

2015

97. ACCEL Innovative Discoveries Presentation, Christiana Hospital, Newark, DE.
96. Combinatorics Seminar, Universidade Federal do Rio de Janeiro (UFRJ), Brazil.
95. Combinatorics Seminar, Xi'an Jiaotong University, Xi'an, China.
94. International Workshop on Algebraic Combinatorics, Zhejiang University, China, September 18-23, 2015 **Plenary Speaker**.
`http://www.math.zju.edu.cn/ ggn/dcc/conference/ZJU-Conference.html`
93. Combinatorics Seminar, Shanghai Jiaotong University, Shanghai, China.
92. Workshop on Algebraic Combinatorics, Tilburg University, The Netherlands, June 17-18, 2015 **Plenary Speaker**.
`http://workshoponalgebraiccombinatorics2015.weebly.com/`
91. Discrete Math Days/Ontario Combinatorics Workshop, Ottawa, Canada, May 21-25, 2015 **Plenary Speaker**.
`http://web5.uottawa.ca/www5/mnewman/dmdocw15/index.html`
90. *Nicolae Radu* Commutative Algebra and Combinatorics Seminar at University of Bucharest/Institute of Mathematics of Romanian Academy, Bucharest, Romania, April

7, 2015.

2014

89. MIT Combinatorics Seminar.
88. Algebraic Combinatorics: Spectral Graph Theory, Erdös-Ko-Rado Theorems and Quantum Information Theory, A Conference to celebrate the work of Chris Godsil, University of Waterloo, Canada **Invited speaker**.
87. Graph Theory, Matrix Theory and Interactions Conference, Queen's University, Canada **Invited Speaker**.
86. Modern Algebraic Graph Theory Conference, Villanova University.
85. University of Delaware, Discrete Mathematics Seminar.
84. AMS Meeting, Knoxville, TN, Algebraic Methods in Combinatorics Session.
83. Purdue University, CS Theory Seminar.

2013

82. University of Delaware, Discrete Mathematics Seminar.
81. University of Waterloo, Canada, Department of Combinatorics & Optimization.
80. LMS *Graph Theory and Interactions* Workshop, Durham, UK, **Invited Speaker**.
79. 16th Rocky Mountain Discrete Math Days University of Wyoming, **Plenary Speaker**.
78. Iowa State University, Colloquium Talk.

2012

77. University of California, San Diego, Combinatorics Seminar.
76. 15th Rocky Mountain Discrete Math Days, Denver University, **Plenary Speaker, I did not participate because of flu**.
75. University of Alabama, Huntsville, Colloquium Talk.
74. CRM Graph Spectra in Computer Science Conference, Barcelona, Spain.
73. SIAM Discrete Math Conference, Halifax, Canada, **Invited Speaker in the Extremal Graph Theory II Minisymposium**.
72. Student Summer Combinatorics Seminar, University of Delaware.
71. University of Delaware, Discrete Mathematics Seminar.
70. AMS Meeting #1079, Tampa, Florida.

2011

69. Rocky Mountain Discrete Mathematics Conference, Laramie, Wyoming.
68. University of Wyoming, Colloquium Talk.
67. College of William and Mary, Colloquium Talk.
66. University of Memphis, Combinatorics Seminar.
65. PIMS Distinguished Lecture Series, University of Regina, Canada, **Plenary Speaker**.
64. Virginia Commonwealth University Discrete Mathematics Seminar.
63. Geometric and Algebraic Combinatorics Conference GAC5, The Netherlands.
62. Research Experience for Graduate Students (REGS) Program, University of Illinois Urbana-Champaign, **4 Invited Research Talks**.
61. 3rd CanaDAM Conference, Victoria, Canada, **Invited Talk in the Spectral Graph Theory Minisymposium**.
60. **Microsoft Research Theory Seminar**, Redmond, Washington.
59. SIAM Conference Applications of Dynamical Systems, Snowbird, **Invited Talk in the Combinatorial Neurodynamics Minisymposium**.
58. University of Malta, Malta, **2 Research Colloquiums**.
57. BIRS Workshop Algebraic Graph Theory, Banff, Canada.
56. Queen's University, Canada, Number Theory-Combinatorics Seminar.
55. University of Delaware, Electrical Engineering Digital Systems Seminar.
54. University of California, San Diego, Combinatorics Seminar.
53. University of Delaware, Discrete Mathematics Seminar.

2010

52. Drexel University Colloquium.
51. International Linear Algebra Society (ILAS) Meeting, Pisa, Italy.

50. Princeton Discrete Mathematics Seminar.
49. AMS Meeting #1058, Macalaster College, St.Paul, Minnesota.
48. Designs, Codes and Geometry (Gary Ebert Retirement) Conference.
47. BIRS Workshop on Ranks of Matrices and Graphs, Banff, Canada.
46. Penn State Combinatorics Seminar.
45. AMS Joint Meeting, San Francisco.

2009

44. POSTECH Combinatorics Seminar, Pohang, South Korea.
43. Joint AMS-KMS Meeting, Seoul, South Korea.
42. 2nd CanaDAM Conference, Montreal, Canada.
41. AMS Meeting #1050, Worcester Polytechnic Institute.

2008

40. Spectral Graph Theory in Rio Conference, Brazil, **Invited Speaker**.
39. McGill University, Discrete Math Seminar.
38. University of Guelph, Colloquium Talk.
37. University of Delaware, Discrete Math. Seminar.
36. University of Waterloo, Tutte Seminar.
35. University of Toronto, Theory/Combinatorics Seminar.
34. Queen's University, Colloquium Talk.
33. SIAM Discrete Math Conference, University of Vermont.
32. California Institute of Technology, Combinatorics Seminar.
31. College of Charleston, Colloquium Talk.
30. University of Delaware, Colloquium Talk.
29. AMS/MAA Joint Mathematics Meeting, San Diego, California.

2007

28. Canadian Math Society Winter Meeting, London, Ontario, Canada.
27. AMS Meeting #1030, Central Sectional, Chicago.
26. Tilburg University, The Netherlands, Colloquium Talk.
25. 6-th Congress of Romanian Mathematicians, University of Bucharest, Romania.
24. 1st Canadian Conference in Discrete and Algorithmic Mathematics, Banff, Canada.
23. STAR Seminar, Dept. of Computer Science, University of California, San Diego.
22. AMS Meeting #1027, SW Sectional, Tucson, Arizona.
21. University of Ottawa, Canada, Colloquium Talk.
20. California Institute of Technology, Combinatorics Seminar.

2006

19. California State University at San Marcos, Colloquium Talk.
18. University of California, San Diego, Combinatorics Seminar.
17. SIAM Discrete Mathematics Conference, University of Victoria, Canada.
16. Western Canada Linear Algebra Meeting, University of Victoria, Canada.
15. Food for Thought Seminar, University of California, San Diego.

2005

14. Queen's University at Kingston, Ontario, Canada, Colloquium Talk.
13. University of Waterloo, Canada, Algebraic Graph Theory Seminar.
12. 12th International Linear Algebra Society Conference, Regina, Canada.
11. Brualdi-Fest: University of Wisconsin, Madison, USA.
10. Queen's Undergraduate Math Club, Kingston, Ontario, Canada.

2004

9. Canadian Math Society Winter Meeting, McGill University, Montréal, Canada.
8. 13th Ontario Combinatorics Workshop, Kingston, Ontario, Canada.

2003	7. AMS Meeting #989, CE+WE Sectional, Boulder, Colorado, USA. 6. 12th Ontario Combinatorics Workshop, Ottawa, Canada. 5. AMS Meeting #985, CE Sectional, Bloomington, Indiana, USA.
2002	4. Queen's University - Royal Military College, Discrete Mathematics Seminar. 3. Queen's University Number Theory Seminar.
2001	2. Queen's Combinatorics Seminar. 1. Colloque Pan-Québecois ISM 2001 des étudiants, McGill University, Canada.

Workshops and Conferences

Symmetry breaking in discrete structures
Casa Matematica Oaxaca Workshop, Oaxaca, Mexico
September 16-21, 2018.
Invited, but declined participation due to scheduling conflicts.

ICERM Workshop *Computation and Optimization of Energy, Packing, and Covering*
April 9-13, 2018 - travel grant from organizers.
`https://icerm.brown.edu/programs/sp-s18/w3/`

AMS-MAA Joint Math Meeting
January 10-13, 2018, San Diego.

Avi60: A Celebration of Mathematics and Computer Science Conference
Institute for Advanced Studies, Princeton.
October 6, 2016.

New Directions in Combinatorics Workshop
Institute of Mathematical Sciences, National University of Singapore, Singapore.
May 20-28, 2016 - travel grant from organizers.

IMA Special Workshop Careers and Opportunities in Industry for Mathematical Scientists, Minneapolis, MN, USA
April 20-22, 2015 - travel grant from organizers.

Modern Trends in Algebraic Graph Theory
Villanova University, USA
June 2-5, 2014 - travel grant from organizers.

London Mathematical Society *Graph Theory and Interactions* Workshop
Durham University, Durham, UK
July 15-25, 2013 - travel grant from organizers.

Algebraic Graph Theory
BIRS Banff Workshop, Alberta, Canada
April 24-31, 2011.

Linear Algebra Methods in Combinatorics
BIRS Banff Workshop, Alberta, Canada
(Declined Invitation due to the birth of my son) January 31-February 3, 2011.

Theory and Applications of Matrices described by Patterns
BIRS Banff Workshop, Alberta, Canada
January 31-February 5, 2010.

Invariants of Incidence Matrices
BIRS Banff Workshop, Alberta, Canada.
March 29-April 3, 2009.

EXCILL-Extremal Combinatorics at Illinois Conference.
University of Illinois at Urbana-Champaign.
November 2006 - travel grant from organizers.

Workshop on Spectra of Families of Matrices.
American Institute for Mathematics, Palo Alto, California.
October 2006 - travel grant from organizers.

CMI/IAS Workshop on Lie Groups, Representations and Discrete Mathematics.
Institute for Advanced Study, Princeton, New Jersey.
November 2005 - travel grant from organizers.

Workshop on Profinite Groups and Applications, Carleton University, Ottawa.
August 2005 - travel grant from organizers.

Canadian Mathematical Society Meeting, University of Waterloo, June 2005.

Automorphic Forms, Group Theory and Graph Expansion.
Institute for Pure and Applied Mathematics, UCLA.
February 2004 - travel grant from the organizers.

Advanced Course on Ramsey Methods in Analysis.
Centre de Recerca Matemàtica, Universita Autònoma de Barcelona, Bellaterra.
January 2004 - travel grant from the organizers.

Workshop on Combinatorics, Probability and Algorithms.
Centre de Recherches Mathématiques, Université de Montréal.
May 2003 - travel grant from the organizers.

Teaching Experience

University of Delaware

2021	Math 688 Combinatorics I, Fall 2021 (10 students). Math 888 Combinatorics II, Spring 2021 (7 students).
2020	Math 688 Combinatorics I, Fall 2020 (14 students). Math 888 Combinatorics II, Spring 2020 (11 students).
2019	Math 688 Combinatorics I, Fall 2019 (16 students). Math 210 Discrete Mathematics I, Spring 2019 (30 students). Math 245 Introduction to Proof, Spring 2019 (20 students).
2018	Sabbatical Fall 2018 (no teaching). Math 315 Discrete Mathematics II, Spring 2018 (21 students).
2017	Math 367 Putnam Seminar, Fall 2017 (5 students). Math 210 Discrete Mathematics I, Fall 2017 (28 students). Math 549 Coding Theory and Cryptography, Spring 2017 (19 students). Math 315 Discrete Mathematics II, Spring 2017 (23 students).

2016	Math 210 Discrete Mathematics I, Fall 2016 (28 students). Math 245 Introduction to Proof, Fall 2016 (31 students). Math829 LP and SDP in Combinatorial Optimization, Spring 2016 (10 students)
2015	Math 210 Discrete Mathematics I, Fall 2015 (26 students). Math 245 Introduction to Proof, Fall 2015 (25 students). Math 888 Combinatorics II, Spring 2015 (8 students). Math/Eleg 467 Mathematics and Technology, Spring 2015 (19 students).
2014	Math 688 Combinatorics I, Fall 2014 (14 students). Math 210 Discrete Mathematics I, Spring 2014 (29 students). Math 888 Combinatorics II, Spring 2014 (7 students).
2013	Math 688 Combinatorics I, Fall 2013 (8 students). Math 315 Discrete Math II, Spring 2013 (21 students) Math 549 Coding Theory and Cryptography, Spring 2013 (34 students) Math 366 Independent Study Graph Theory, Spring 2013 (2 students).
2012	Math 845 Graduate Algebra II, Fall 2012 (7 students) Math 870 Reading Course Spectral Graph Theory, Fall 2012 (3 students) Math 650 Graduate Algebra I, Spring 2012 (11 students) Math 210 Discrete Mathematics I, Spring 2012 (34 students) Math 870 Reading Course Probabilistic Method, Spring 2012 (3 students).
2011	Sabbatical Fall 2011 (no teaching) Math 888 Combinatorics II, Spring 2011 (9 students) Math 466 Vector Spaces, Spring 2011 (1 student).
2010	Math 688 Graduate Combinatorics I, Fall 2010 (4 students) Math 245 Introduction to Proof, Fall 2010 (22 students) Math 870 Combinatorics II, Fall 2010 (8 students) Math 466 Reading Course on Coding Theory, Summer 2010 (1 student) Math 870 Reading Course on Algebraic Graph Theory, Spring 2010 (2 students) Math 870 Reading Course in Vector Spaces, Spring 2010 (2 students) Math 688 Graduate Combinatorics I, Spring 2010 (6 students) Math 549 Coding Theory and Cryptography, Spring 2010 (8 students).
2009	Math 672 Vector Spaces, Fall 2009 (24 students) Math 243 Calculus, Spring 2009 (25 students).

University of California, San Diego

2008	Math 20C, Spring 2008 (114 students). Math 109, Introduction to Mathematical Reasoning, Winter 2008 (44 students). Math 20C, Winter 2008 (216 students).
2007	Math 20C, Fall 2007 (340 students). Math 10B, Spring 2007 (205 students). Math 10C, Winter 2007 (272 students). Math 10A, Fall 2006 (208 students).

Queen's University at Kingston, Ontario, Canada

2006	Math 402/802 Combinatorics, January 2006.
2004	Math126 Calculus, Summer 2004. Math 126 Calculus, Winter 2004.
2003	Math 126 Calculus, Summer 2003. Math 126 Calculus, Winter 2003.
2002	Math 006 PreCalculus, Summer 2002. Math 126 Calculus, Winter 2002.
2001	Math 126 Calculus, Fall 2001.
UD Service	Member Graduate Committee Math Dept, 2021-2022, 2016-2017, 2014-2015.
	Secretary PT Committee UD Math Department, April 2020-March 2021.
	College of Arts and Sciences PT Committee Member, 2020-2021.
	Member Math Chair Search Committee, 2019-2020.
	MSRI Department Liaison, 2019-present.
	Member Committee Cybersecurity Initiative Director Search, 2018.
	UD Math Department Undergraduate Studies Director, 2017-2018.
	College of Arts and Sciences Promotion and Tenure Committee Member, 2017-2018.
	Third Reader, UD Board of Senior Thesis Readers, 2015-2018, 2019-2020.
	Member of the Professional Development Committee 2015-2016.
	Member of the UD Goldwater Selection Committee 2014-2015.
	Member of the selection committee for the Summer Scholar Program in Mathematics. University of Delaware 2012, 2013.
	Faculty Advisor for the Undergraduate Math Club. 2010-2011, Spring 2012, 2012-2013, 2013-2014.
	Member of the Undergraduate Committee. 2010-2011, Spring 2012, 2012-2014.
	Member Linear Algebra Preliminary Exam Committee. Winter 2010, 2011, 2014, 2017 Summer 2010, 2011, 2012.
	Member of the Colloquium Committee. 2009-2010, Spring 2019.