

Leslie Hogben

Dio Lewis Holl Chair in Applied Mathematics and Professor of Mathematics
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BACKGROUND

Degrees held:

Ph.D. Yale University 1978 (Advisor: Nathan Jacobson; NSF Graduate Fellow)
 B.A. Swarthmore College 1974 (summa cum laude, Phi Beta Kappa)

Professional Experience:

Iowa State University Department of Mathematics,
 Dio Lewis Holl Chair in Applied Mathematics, 2012-
 Professor, 2006-
 (sabbatical: Fall 2014-Spring 2015, Fall 2008-Spring 2009)
 Associate Professor, 1983-2006
 (sabbatical, Fall 2003; half-time: 1987-1991; leave without pay: 1985-1987)
 Assistant Professor, 1980-1983
 Instructor (Tenure-track), 1978-1980
 Iowa State University College of Liberal Arts and Sciences,
 Associate Dean for Graduate Studies and Faculty Development, March 2019-
 Iowa State University Department of Electrical and Computer Engineering,
 Professor (courtesy appointment), 2013-8
 American Institute of Mathematics,
 Associate Director for Diversity (part-time), 2007-
 Institute for Mathematics and its Applications,
 General member, Sept-Nov, 2014

HONORS

2018 Margaret Ellen White Award (Iowa State University, for graduate mentoring)
 2018 College of Liberal Arts and Sciences Excellence in Graduate Mentoring Award
 2015 College of Liberal Arts and Sciences Diversity Award
 2012 Dio Lewis Holl Chair in Applied Mathematics
 2012 Vinograd Graduate Advising Award (Mathematics Department)
 2012 Iowa Women of Innovation finalist (Academic Innovation and Leadership)
 2008 *Choice* magazine Outstanding Academic Title: *Handbook of Linear Algebra*

MEMBERSHIPS

AAAS, AMS, AWM, IEEE, ILAS, NAM, Phi Beta Kappa, SACNAS, Sigma Xi, SIAM

RESEARCH PUBLICATIONS

Papers cited 858 times by at least 523 authors, h-index = 16 (includes 72 citations to [33] not reported in a name search). In addition, *Handbook of Linear Algebra* 2nd ed. cited 213 times and *Handbook of Linear Algebra* cited 42 times. Data from MathSciNet 2/1/19.

Books Edited

- (IV) F. Chung, R.L. Graham, F. Hoffman, L. Hogben, R. Mullin, D.B. West, editors. 50 Years of Combinatorics, Graph Theory, and Computing. In preparation. CRC Press, 2020.
- (III) A. Beveridge, J. Griggs, L. Hogben, G. Musiker, P. Tetali, editors. *Recent Trends in Combinatorics*, IMA Volumes in Mathematics and its Applications **159**, Springer, 2016.
- (II) L. Hogben, editor. *Handbook of Linear Algebra*, 2nd edition, CRC Press, Boca Raton, 2014.
- (I) L. Hogben, editor. *Handbook of Linear Algebra*, Chapman Hall/CRC Press, Boca Raton, 2007.

Book Chapters

- (d) L. Hogben. Nordhaus-Gaddum Problems for Colin de Verdière Type Parameters, Variants of Tree-width, and Related Parameters. In *Recent Trends in Combinatorics*, pp. 275–294, Springer, 2016.
- (c) S. Fallat and L. Hogben. Minimum Rank, Maximum Nullity, and Zero Forcing Number of Graphs. In *Handbook of Linear Algebra*, 2nd ed., pp. 46-1–46-36, CRC Press, Boca Raton, FL, 2014.
- (b') L. DeAlba, L. Hogben, and A. Wangsness Wehe. Matrix Completion Problems (update of (b)). In *Handbook of Linear Algebra*, 2nd ed., pp. 49-1–49-30, CRC Press, Boca Raton, FL, 2014.
- (b) L. Hogben and A. Wangsness. Matrix Completion Problems. In *Handbook of Linear Algebra*, pp. 35-1–35-21, Chapman Hall/CRC Press, Boca Raton, FL, 2007.
- (a) L. Hogben. Identities of Nonassociative Algebras Studied by Computer. In *Algebraists' homage: papers in ring theory and related topics (New Haven, Conn., 1981)*, pp. 321–324, *Contemp. Math.*, 13, Amer. Math. Soc., Providence, RI, 1982.

Papers (Refereed journals, appeared or accepted)

- 90. L. Hogben, J.C.-H. Lin, D. D. Olesky, P. van den Driessche. The sepr-sets of sign patterns. To appear in *Linear Multilinear Algebra*. <https://arxiv.org/abs/1807.04874>
- 89. C. Bozeman, B. Brimkov, C. Erickson, D. Ferrero, M. Flagg, L. Hogben. Restricted power domination and zero forcing problems. *J. Combinatorial Optimization*, in press, <https://doi.org/10.1007/s10878-018-0330-6>
- 88. J. Carlson, L. Hogben, J. Kritschgau, K. Lorenzen, M.S. Ross, S. Selken, V. Valle Martinez. Throttling positive semidefinite zero forcing propagation time on graphs. *Discrete Appl. Math.*, in press, <https://doi.org/10.1016/j.dam.2018.06.017>.
- 87. G. Aalipour, A. Abiad, Z. Berikkyzy, L. Hogben, F.H.J. Kenter, J.C.-H. Lin, M.Tait. Proof of a conjecture of Graham and Lovasz concerning unimodality of coefficients of the distance characteristic polynomial of a tree. *Electron. J. Linear Algebra*, 34 (2018) 373–380.
- 86. K.F. Benson, D. Ferrero, M. Flagg, V. Furst, L. Hogben, V. Vasilevska. Note on Nordhaus-Gaddum problems for power domination. *Discrete Appl. Math.*, 251 (2018), 103–113.
- 85. J. Breen, B. Brimkov, J. Carlson, L. Hogben, K.E. Perry, C. Reinhart. Throttling for the game of Cops and Robbers on graphs. *Discrete Math.*, 341 (2018) 2418–2430.
- 84. J.S. Alameda, E. Curl, A. Grez, L. Hogben, O'N. Kingston, A. Schulte, D. Young, M. Young. Families of graphs with maximum nullity equal to zero-forcing number. *Special Matrices*, 6 (2018), 56–67.
- 83. B. Bjorkman, L. Hogben, S. Ponce, C. Reinhart, T. Tranel. Applications of analysis to the determination of the minimum number of distinct eigenvalues of a graph. *Pure Appl. Funct. Anal.*, 3 (2018), 537–563.

82. D. Ferraro, L. Hogben, F.H.J. Kenter, M. Young. The relationship between k -forcing and k -power domination. *Discrete Math.* **341** (2018), 1789–1797.
81. K.F. Benson, D. Ferraro, M. Flagg, V. Furst, L. Hogben, V. Vasilevska, B. Wissman. Zero forcing and power domination for graph products. *Australasian J. Combinatorics* **70** (2018), 221–235.
80. W. Barrett, S. Fallat, H. T. Hall, L. Hogben, J. C.-H. Lin, B.L. Shader. Generalizations of the Strong Arnold Property and the minimum number of distinct eigenvalues of a graph. *Electron. J. Combinatorics*, **24** (2017) P2.40 (28 pages).
79. L. Hogben, K. Palmowski, D.E. Roberson, S. Severini. Orthogonal representations, projective rank, and fractional minimum positive semidefinite rank: connections and new directions. *Electron. J. Linear Algebra* **32** (2017), 98–115.
78. S. Butler, M. Catral, H.T. Hall, L. Hogben, X. Martinez-Rivera, B. Shader, P. van den Driessche. The enhanced principal rank characteristic sequence for Hermitian matrices. *Electron. J. Linear Algebra* **32** (2017), 58–75.
77. M. Dairyko, L. Hogben, J.C.-H. Lin, J. Lockhart, D. Roberson, S. Severini, M. Young. Note on von Neumann and Rényi entropies of a graph. *Linear Algebra Appl.*, **521** (2017) 240–253.
76. A. Berliner, C. Bozeman, S. Butler, M. Catral, L. Hogben, B. Kroschel, J.C.-H. Lin, N. Warnberg, M. Young. Zero forcing propagation time on oriented graphs. *Discrete Appl. Math.* **224** (2017), 45–59.
75. D. Ferraro, L. Hogben, F.H.J. Kenter, M. Young. Note on power propagation time and lower bounds for the power domination number. *J. Combinatorial Optimization*, **34** (2017), 736–641.
74. E. Gethner, L. Hogben, B. Lidicky, F. Pfender, A. Ruiz, M. Young. Crossing numbers of complete tripartite and balanced complete multipartite graphs. *J. Graph Theory*, **84** (2017), 552–565.
73. L. Hogben, K. Palmowski, D. Roberson, M. Young. Fractional Zero Forcing via Three-color Forcing Games. *Discrete Appl. Math.*, **213** (2016), 114–129.
72. S. Butler, C. Erickson, L. Hogben, K. Hogenson, L. Kramer, R.L. Kramer, J.C.-H. Lin, R.R. Martin, D. Stolee, N. Warnberg, M. Young. Rainbow arithmetic progressions. *J. Combinatorics*, **7** (2016), 595–626.
71. G. Aalipour, A. Abiad, Z. Berikkyzy, J. Cummings, J. De Silva, W. Gao, K. Heysse, L. Hogben, F.H.J. Kenter, J.C.-H. Lin, M. Tait. On the distance spectra of graphs. *Linear Algebra Appl.*, 497 (2016), 66–87.
70. S. Butler, M. Catral, S.M. Fallat, H.T. Hall, L. Hogben, P. van den Driessche, M. Young. The enhanced principal rank characteristic sequence. *Linear Algebra Appl.* **498** (2016), 181–200.
69. L. Hogben, B.-S. Tam, U. Wilson. Note on the Jordan form of an irreducible eventually nonnegative matrix. *Electron. J. Linear Algebra*, **30** (2015), 279–285.
68. D. Burgarth, V. Giovanetti, L. Hogben, S. Severini, M. Young. Logic circuits from zero forcing. *Natural Computing*, **14** (2015), 485–490.
67. C. Bozeman, AV. Ellsworth, L. Hogben, J. C.-H. Lin, G. Maurer, K. Nowak, A. Rodriguez, J. Strickland. Minimum rank of graphs with loops. *Electron. J. Linear Algebra* **27** (2014), 907–934.
66. W. Barrett, S. Butler, M. Catral, S. M. Fallat, H. T. Hall, L. Hogben, P. van den Driessche, M. Young. The principal rank characteristic sequence over various fields. *Linear Algebra Appl.* **459** (2014), 222–236.
65. C. Grood, J.A. Harmse, L. Hogben, T. Hunter, B. Jacob, A. Klimas, S. McCathern, Minimum rank of zero-diagonal matrices described by a graph. *Electron. J. Linear Algebra*, **27** (2014), 458–477.
64. C. Qiu, N. Vaswani, B. Lois, L. Hogben. Recursive Robust PCA or Recursive Sparse Recovery in Large but Structured Noise. *IEEE Trans. Information Theory*, **60** (2014), 5007–5039.
63. W. Barrett, S. Butler, M. Catral, S.M. Fallat, H.T. Hall, L. Hogben, M. Young. The maximum nullity of a complete subdivision graph is equal to its zero forcing number. *Electron. J. Linear Algebra*, **27** (2014), 444–457.

62. A. Berliner, M. Catral, L. Hogben, M. Huynh, M. Young. Minimum rank, maximum nullity, and zero forcing number for simple digraphs. *Electron. J. Linear Algebra* **26** (2013), 762-780.
61. W. Barrett, S. Fallat, H.T. Hall, L. Hogben. Note on Nordhaus-Gaddum problems for Colin de Verdière type parameters. *Electron. J. Combinatorics*, **20** (2013) P56 (9 pages).
60. J. Ekstrand, C. Erickson, H.T. Hall, D. Hay, L. Hogben, R. Johnson, N. Kingsley, S. Osborne, T. Peters, J. Roat, A. Ross, D.D. Row, N. Warnberg, M. Young. Positive semidefinite zero forcing. *Linear Algebra Appl.*, **439** (2013), 1862-1874.
59. D. Burgarth, D. D'Alessandro, L. Hogben, S. Severini, M. Young. Zero forcing, linear and quantum controllability for systems evolving on networks. *IEEE Trans. Automatic Control*, **58** (2013), 2349-2354.
58. F. Barioli, W. Barrett, S. Fallat, H.T. Hall, L. Hogben, B. Shader, P. van den Driessche, H. van der Holst. Parameters related to tree-width, zero forcing, and maximum nullity of a graph. *J. Graph Theory*, **72** (2013), 146-177.
57. L. Hogben, U. Wilson. Eventual properties of matrices. *Electron. J. Linear Algebra* **23** (2012), 953-965.
56. M. Catral, A. Cepek, L. Hogben, M. Huynh, K. Lazebnik, T. Peters, M. Young. Zero forcing number, maximum nullity, and path cover number of subdivided graphs. *Electron. J. Linear Algebra*, **23** (2012), 906-922.
55. L. Hogben, M. Huynh, N. Kingsley, S. Meyer, S. Walker, M. Young. Propagation time for zero forcing on a graph. *Discrete Appl. Math.* **160** (2012), 1994-2005.
54. J. Ekstrand, C. Erickson, D. Hay, L. Hogben, J. Roat. Note on positive semidefinite maximum nullity and positive semidefinite zero forcing number of partial 2-trees. *Electron. J. Linear Algebra* **23** (2012), 79-87.
53. M. Catral, C. Erickson, L. Hogben, D.D. Olesky, P. van den Driessche. Sign patterns that allow strong eventual nonnegativity. *Electron. J. Linear Algebra* **23** (2012), 1-10.
52. F. Barioli, W. Barrett, S. Fallat, H.T. Hall, L. Hogben, H. van der Holst. On the graph complement conjecture for minimum rank. *Linear Algebra Appl.* **436** (2012), 4373-4391.
51. C. Edholm, L. Hogben, M. Huynh, J. LaGrange, D. Row. Vertex and edge spread of zero forcing number, maximum nullity, and minimum rank of a graph. *Linear Algebra Appl.* **436** (2012), 4352-4372.
50. L. Hogben. A note on minimum rank and maximum nullity of sign patterns. *Electron. J. Linear Algebra* **22** (2011) 203-213.
49. L. Hogben. Eventually cyclic matrices and a test for strong eventual nonnegativity. *Electron. J. Linear Algebra* **19** (2010), 129-140.
48. L. Hogben, J. McLeod. A linear algebraic view of partition regular matrices. *Linear Algebra Appl.* **433** (2010) 1809-1820.
47. F. Barioli, W. Barrett, S.M. Fallat, H.T. Hall, L. Hogben, B. Shader, P. van den Driessche, H. van der Holst. Zero forcing parameters and minimum rank problems. *Linear Algebra Appl.* **433** (2010), 401-411.
46. H.T. Hall, L. Hogben, R. Martin, B. Shader. Expected values of parameters associated with the minimum rank of a graph. *Linear Algebra Appl.* **433** (2010), 101-117.
45. L. DeLoss, J. Grout, L. Hogben, T. Mackay, J. Smith, G. Tims. Techniques for determining the minimum rank of a small graph. *Linear Algebra Appl.* **432** (2010), 2995-3001.
44. M. Allison, E. Bodine, L.M. DeAlba, J. Debnath, L. DeLoss, C. Garnett, J. Grout, L. Hogben, B. Im, H. Kim, R. Nair, O. Pryporova, K. Savage, B. Shader, A. Wangsness Wehe. Minimum rank of skew-symmetric matrices described by a graph. *Linear Algebra Appl.* **432** (2010), 2457-2472.
43. M. Catral, L. Hogben, D.D. Olesky, P. van den Driessche. Sign patterns that require or allow power-positivity. *Electron. J. Linear Algebra* **19** (2010), 121-128.

42. A. Berman, M. Catral, L.M. DeAlba, A. Elhashash, F. J. Hall, Frank, L. Hogben, I.-J. Kim, D. D. Olesky, P. Tarazaga, M. J. Tsatsomeros, P. van den Driessche. Sign patterns that allow eventual positivity. *Electron. J. Linear Algebra* **19** (2010), 108-120.
41. E.M. Ellison, L. Hogben, M.J. Tsatsomeros. Sign patterns that require eventual positivity or require eventual nonnegativity. *Electron. J. Linear Algebra* **19** (2010), 98-107.
40. L. Hogben. Minimum rank problems. *Linear Algebra Appl.* **432** (2010), 1961-1974.
39. L. Hogben, B. Shader. Maximum generic nullity of a graph. *Linear Algebra Appl.* **432** (2010), 857-866.
38. L.M. DeAlba, J. Grout, L. Hogben, R. Mikkelson, K. Rasmussen. Universally optimal matrices and field independence of the minimum rank of a graph. *Electron. J. Linear Algebra* **18** (2009) 403-419.
37. L.M. DeAlba, L. Hogben, B.K. Sarma. The Q-matrix Completion Problem. *Electron. J. Linear Algebra* **18** (2009) 176-191.
36. F. Barioli, S.M. Fallat, H.T. Hall, D. Hershkowitz, L. Hogben, H. van der Holst, B. Shader. On the minimum rank of not necessarily symmetric matrices: a preliminary study. *Electron. J. Linear Algebra* **18** (2009), 126-145.
35. A. Berman, S. Friedland, L. Hogben, U.G. Rothblum, B. Shader. An upper bound for minimum rank of a graph. *Linear Algebra Appl.* **429** (2008), 1629-1638.
34. L. Hogben. Orthogonal representations, minimum rank, and graph complements. *Linear Algebra Appl.*, **428** (2008), 2560-2568.
33. AIM Minimum Rank – Special Graphs Work Group (F. Barioli, W. Barrett, S. Butler, S. M. Cioaba, D. Cvetković, S. M. Fallat, C. Godsil, W. Haemers, L. Hogben, R. Mikkelson, S. Narayan, O. Pryporova, I. Sciriha, W. So, D. Stevanović, H. van der Holst, K. Vander Meulen, and A. Wangsness). Zero forcing sets and the minimum rank of graphs. *Linear Algebra Appl.*, **428** (2008), 1628-1648.
32. A. Berman, S. Friedland, L. Hogben, U.G. Rothblum, B. Shader. Minimum rank of matrices described by a graph or pattern over the rational, real and complex numbers. *Electron. J. Combinatorics*, **15** (2008), R 25 (19 pages).
31. S. Fallat, L. Hogben. The Minimum Rank of Symmetric Matrices Described by a Graph: A Survey, *Linear Algebra Appl.*, **426** (2007), 558-582.
30. N.L. Chenette, S.V. Droms, L. Hogben, R. Mikkelson, O. Pryporova. Minimum Rank of a Tree over an Arbitrary Field. *Electron. J. Linear Algebra* **16** (2007), 183-186.
29. L.M. DeAlba, I.R. Hentzel, L. Hogben, J.J. McDonald, R. Mikkelson, O. Pryporova, B. Shader, K. Vander Meulen. Spectrally Arbitrary Patterns: Reducibility and the $2n$ Conjecture for $n = 5$. *Linear Algebra Appl.*, **423** (2007), 262-276.
28. L. Hogben, H. van der Holst. Forbidden minors for the class of graphs G with $\xi(G) \leq 2$, *Linear Algebra Appl.*, **423** (2007), 42-52.
27. L. Hogben. The copositive completion problem: unspecified diagonal. *Linear Algebra Appl.*, **420** (2007), 160-162.
26. A. Chowdhury, L. Hogben, J. Melancon, R. Mikkelson. Rational realization of maximum eigenvalue multiplicity of symmetric tree sign patterns. *Linear Algebra Appl.*, **418** (2006), 380-393.
25. L.M. DeAlba, T. Hardy, I.R. Hentzel, L. Hogben, A. Wangsness. Minimum rank and maximum eigenvalue multiplicity of symmetric tree sign patterns. *Linear Algebra Appl.*, **418** (2006), 389-415.
24. J. Bowers, J. Evers, L. Hogben, S. Shaner, K. Snider, A. Wangsness. On completion problems for various classes of P -matrices. *Linear Algebra Appl.*, **413** (2006), 342-354.
23. F. Barioli, S. Fallat, L. Hogben. A variant on the graph parameters of Colin de Verdière: Implications to the minimum rank of graphs. *Electron. J. Linear Algebra*, **13** (2005), 387-404.
22. F. Barioli, S. Fallat, L. Hogben. On the difference between the maximum multiplicity and path cover number for tree-like graphs. *Linear Algebra Appl.*, **409** (2005), 13-31.
21. L. Hogben, C.R. Johnson and R. Reams. The copositive matrix completion problem. *Linear Algebra Appl.*, **408** (2005) 207-211.

20. L. Hogben. Spectral graph theory and the inverse eigenvalue problem of a graph. *Electron. J. Linear Algebra*, **14** (2005), 12-31.
19. F. Barioli, S. Fallat, L. Hogben. Computation of path cover number and minimal rank for graphs. *Linear Algebra Appl.* **392** (2004), 289-303.
18. L.M. DeAlba, T. Hardy, L. Hogben, A. Wangsness. The (weakly) sign-symmetric P -Matrix completion problems. *Electron. J. Linear Algebra*, **10** (2003), 257-271.
17. L. Hogben. Matrix completion problems for pairs of related classes of matrices. *Linear Algebra Appl.*, **373** (2003), 13-29.
16. J.-Y. Choi, L.M. DeAlba, L. Hogben, B. Kivunge, S. Nordstrom, M. Shedenhelm. The nonnegative P_0 -matrix completion. *Electron. J. Linear Algebra*, **10** (2003), 46-59.
15. L. Hogben. The symmetric M -matrix and symmetric inverse M -matrix completion problems. *Linear Algebra Appl.* **353** (2002) 159-168.
14. J.-Y. Choi, L.M. DeAlba, L. Hogben, M. Maxwell, A. Wangsness. The P_0 -matrix completion problem. *Electron. J. Linear Algebra*, **9** (2002), 1-20.
13. L. Hogben. Graph theoretic methods for matrix completion problems. *Linear Algebra Appl.* **328** (2001), 161-202.
12. L.M. DeAlba, L. Hogben. Completions of P -matrix patterns. *Linear Algebra Appl.*, **319** (2000), 83-102.
11. L. Hogben. Inverse M -Matrix Completions of Patterns Omitting Some Diagonal Positions. *Linear Algebra Appl.*, **313** (2000), 173-192.
10. L. Hogben. Completions of M -matrix patterns. *Linear Algebra Appl.*, **285** (1998), 143-152.
9. L. Hogben. Completions of inverse M -matrix patterns. *Linear Algebra Appl.*, **282** (1998), 145-160.
8. B. Cain, L.M. DeAlba, L. Hogben, C.R. Johnson. Multiplicative perturbations of stable and convergent operators. *Linear Algebra Appl.*, **268** (1998) 151-169.
7. L. Hogben, C. Bergman. Deductive varieties of modules and universal algebras, *Trans. AMS*, **289** (1985), 303-320.
6. L. Hogben, V. Kac. The correct multiplication table for the exceptional Jordan superalgebra F . *Comm. Algebra* **11** (1983), 1155-1156.
5. I.R. Hentzel, L. Hogben. Exhaustive checking of sparse algebras. *J. Algorithms* **2** (1981), 44-49.
4. L. Hogben, K. McCrimmon. Maximal modular inner ideals and the Jacobson radical of a Jordan algebra. *J. Algebra* **68** (1981), 155-169.
3. L. Hogben. Radicals and homotopes of Jordan algebras. *Comm. Algebra* **9** (1981), 179-194.
2. I.R. Hentzel, L. Hogben, H.F. Smith. flexible derivation alternator rings. *Comm. Algebra* **8** (1980), 1997-2014.
1. L. Hogben. Radicals and semi-prime ideals of Jordan triple systems. *Comm. Algebra* **7** (1979), 1313-1328.

Papers (Other journals and proceedings, appeared or accepted)

- H. A. Berliner, C. Brown, J. Carlson, N. Cox, L. Hogben, J. Hu, K. Jacobs, K. Manternach, T. Peters, N. Warnberg, M. Young. Path cover number, maximum nullity, and zero forcing number of oriented graphs and other simple digraphs. *Involve* **8** (2015), 147-167.
- G. C. Qiu, N. Vaswani, L. Hogben. Recursive Robust PCA or Recursive Sparse Recovery in Large but Structured Noise. *ICASSP 2013*, 5954-5958 (abstract of part of [64]).
- F. M. Archer, M. Catral, C. Erickson, R. Haber, L. Hogben, X. Martinez-Rivera, A. Ochoa, Potentially eventually exponentially positive sign patterns. *Involve* **6** (2013), 261-271.
- E. M. Archer, M. Catral, C. Erickson, R. Haber, L. Hogben, X. Martinez-Rivera, A. Ochoa. Constructions of potentially eventually positive sign patterns with reducible positive part. *Involve* **4** (2011), 405-410.

- D. E. Almodovar, L. DeLoss, L. Hogben, K. Hogenson, K. Murphy, T. Peters, C. Ramirez. Minimum rank, maximum nullity and zero forcing number for selected graph families. *Involve* **3** (2010), 371-392.
- C. L. Hogben, Spectral Graph Theory and the Inverse Eigenvalue Problem of a Graph, *Chamchuri Journal of Mathematics* (Proceedings of International Conference on Algebra and Related Topics 2008).
- B. Relationships between the Completion problems for Various Classes of Matrices. *Proceedings of the 8th SIAM Conference on Applied Linear Algebra*, available electronically at <http://www.siam.org/meetings/la03/proceedings/>
- A. A. Abian, L. Hogben, E.H. Johnston. Laurent Series Obtained by Long Division, *Radovi Matematicki*, **1** (1985), 79-99.

Papers under review

- i) L. Hogben, J.C.-H. Lin, M. Young. Multi-part Nordhaus-Gaddum type problems for tree-width, Colin de Verdière type parameters, and Hadwiger number. <http://arxiv.org/abs/1604.08817>
- ii) W. Barrett, S. Butler, S. Fallat, H.T. Hall, L. Hogben, J.C.-H. Lin, B.L. Shader, M. Young. The inverse eigenvalue problem of a graph: Multiplicities and minors. <https://arxiv.org/abs/1708.00064v1>
- iii) L. Hogben, N. Shaked-Monderer. SPN graphs and rank-1 CP-completable graphs. https://orion.math.iastate.edu/lhogben/research/Hogben_Shaked-Monderer_SPNgraphs.pdf
- iv) L. Hogben. Zero forcing and maximum nullity for hypergraphs. <https://arxiv.org/abs/1808.09908>
- v) D. Ferrero, M. Flagg, H.T. Hall, L. Hogben, J.C.-H. Lin, S.A. Meyer, S. Nasserar, B. Shader. Rigid linkages and partial zero forcing. <https://arxiv.org/abs/1808.05553>
- vi) B. Brimkov, K. Duna, L. Hogben, K. Lorenzen, C. Reinhart, S.-Y. Song, Mark Yarrow. Graphs that are cospectral for the distance Laplacian. <https://arxiv.org/abs/1812.05734>

RESEARCH LECTURES

Plenary Lectures

- (1) TBA, Workshop for Women in Graph Theory and Applications (WIGA), to be held at the Institute for Mathematics and its Applications, August 19 - 23, 2019.
- (2) TBA, Graph Searching in Canada (GRASCan) Workshop 2019, to be held at Fields Institute, Toronto, August 6-7, 2019.
- (3) TBA, 22nd International Linear Algebra Society (ILAS) Conference, to be held in Rio de Janeiro, Brazil, July 2019.
- (4) "The Inverse Eigenvalue Problem of a Graph," PIMS - UVic Distinguished Lecture, University of Victoria, March 22, 2018.
- (5) "Distance spectra," 47th Southeastern International Conference on Combinatorics, Graph Theory & Computing (SEICCGTC), Florida Atlantic University, Boca Raton, FL, March 8, 2016.
- (6) "Minimum rank of matrices described by a graph or digraph," 15th International Linear Algebra Society (ILAS) Conference, Cancun, Mexico, June 16, 2008.
- (7) "Combinatorial matrix theory," International Conference on Algebra and Related Topics (ICART 2008), Bangkok, Thailand, May 28, 2008.

Invited Lectures (last five years)

1. “Throttling for Cops and Robbers and Zero Forcing,” Coast Combinatorics Conference, University of Victoria, March 24, 2018.
2. “Power domination and zero forcing: Using graphs to model real-world problems,” Colloquium, University of Hawai’i, February 1, 2018.
3. “Crossing numbers of complete multipartite graphs,” (in special session) Joint Mathematics Meetings, San Diego, CA, January 11, 2018.
4. “Power domination and zero forcing: Using graphs to model real-world problems,” Women Doing Math Seminar, Texas State University, April 27, 2017.
5. “Enhanced principal rank characteristic sequences of symmetric and Hermitian matrices,” Colloquium, Auburn University, March 31, 2017.
6. “Multi-part Nordhaus-Gaddum type problems for tree-width, Colin de Verdière type parameters, and Hadwiger number,” Coast Combinatorics Conference, Kailua-Kona, February 15, 2017.
7. “Zero Forcing,” AIM workshop *Zero Forcing and its applications*, American Institute of Mathematics, January 30, 2017.
8. “Multi-part Nordhaus-Gaddum type problems for tree-width, Colin de Verdière type parameters, and Hadwiger number,” (in special session) AMS Fall Sectional, St. Thomas University, Minneapolis, October 29, 2016.
9. “Distance spectra,” Colloquium, Purdue University, September 6, 2016.
10. “Applications of minimum rank of matrices described by a graph or sign pattern,” Numerical Analysis Seminar, University of Oxford, April 26, 2016.
11. “Generalizations of the Strong Arnold Property and the minimum number of distinct eigenvalues of a graph,” (in special session) AMS Spring Sectional, North Dakota State University, April 16, 2016.
12. “Distance spectra,” Colloquium, Case Western Reserve University, March 25, 2016.
13. “Generalizations of the Strong Arnold Property and the minimum number of distinct eigenvalues of a graph,” Keynote lecture in the Combinatorial Matrix Theory Special Session at the 47th Southeastern International Conference on Combinatorics, Graph Theory & Computing (SEICCGTC), Florida Atlantic University, Boca Raton, FL, March 9, 2016.
14. “Perron-Frobenius theory of nonnegative matrices and their generalizations,” in mini-symposium SIAM Applied Linear Algebra Conference, Atlanta, GA, October 27, 2015.
15. “Eventual matrix properties related to positivity,” (in special session) Joint Mathematics Meetings, San Antonio, TX, January 13, 2015.
16. “Rectilinear crossing numbers of complete tripartite graphs,” (in special session) Joint Mathematics Meetings, San Antonio, TX, January 13, 2015.
17. “Nordhaus-Gaddum sum problems for tree-width and Colin de Verdière parameters,” Annual Program Seminar, Institute for Mathematics and its Applications, Minneapolis, MN, October 9, 2014.
18. “Eventual properties related to nonnegativity,” (in mini-symposium) 19th Conference of the International Linear Algebra Society, Seoul, Korea, August 9, 2014.
19. “Minimum rank, maximum nullity, zero forcing number,” (in mini-symposium) SIAM Discrete Mathematics conference, June 18, 2014.
20. “Maximum nullity of a complete subdivision graph is equal to its zero forcing number,” University of Puerto Rico - Rio Piedras, March 19, 2014.

Panel presentations at conferences (last five years)

1. MAA Panel: Tips and Tricks to Securing Funding for Undergraduate Research, Joint Mathematics Meetings, San Diego, CA, January 13, 2018.

Workshop participation (in addition to those where lectured, listed above, or organized, listed below; last five years)

1. Oberwolfach Research Institute for Mathematics 5-day workshop, *Copositivity and Complete Positivity*, Oct 29 - Nov 3, 2017.
2. Institute for Mathematics and its Applications 5-day workshop, *Information Theory and Concentration Phenomena*, April 13-17, 2015, Minneapolis, MN.
3. Institute for Mathematics and its Applications 5-day workshop, *Geometric and Enumerative Combinatorics*, Nov 10-14, 2014, Minneapolis, MN.
4. American Institute of Mathematics 5-day workshop, *Positivity, graphical models, and modeling of complex multivariate dependencies*, Oct 13-17, 2014, Palo Alto, CA.
5. Institute for Mathematics and its Applications 5-day workshop, *Additive and Analytic Combinatorics*, Sept 29-Oct 3, 2014, Minneapolis, MN.
6. Institute for Mathematics and its Applications 5-day workshop, *Probabilistic and Extremal Combinatorics*, Sept 8-12, 2014, Minneapolis, MN.
7. American Institute of Mathematics 5-day workshop, *Exact crossing numbers*, April 28-May 2, 2014, Palo Alto, CA.

GRANTS (current)

- 2018-19 NSA Workshop Grant, “The Rocky Mountain-Great Plains Graduate Research Workshops in Combinatorics”, co-PI, Michael Ferrara, PI, 3 other co-PIs, through University of Colorado Denver.
- 2017-20 NSF Mathematical Sciences Institute grant, “American Institute of Mathematics Research Conference Center: A Model for Collaboration,” co-PI, J. Brian Conrey PI, 3 other co-PIs, through AIM.
- 2017-18 IMA mini-grant, “Careers in Industry mini-workshops and the Graduate Research Workshop in Combinatorics: Enhancing doctoral training in mathematics through collaborative research and professional development”, (3 mini- workshops), PI, with 8 co-PIs.
- 2016-20 NSF infrastructure grant, “Research Experiences for Undergraduate Faculty”, (4 workshops and follow-up), AIM PI, with 1 AIM co-PI, through AIM in collaboration with ICERM.
- 2016-19 NSF conference grant, “Graduate Research Workshop in Combinatorics (GRWC),” ISU PI, with 4 ISU co-PIs, in collaboration with University of Colorado Denver, University of Denver, and University of Wyoming, held at ISU in 2018.
- 2015-20 NSF REU site grant, “Iowa State University Mathematics REU,” PI, with 1 co-PI, (3 summers funding).

CONFERENCE/WORKSHOP/SPECIAL SESSION ORGANIZING

Conference/Workshop Organizing

Ongoing programs:

- a) Organizing Committee, Rocky Mountains Great Plains Graduate Research Workshop in Combinatorics (GRWC), 2014-. GRWC 2015 was and GRWC 2018 will be held at Iowa State University.
- b) Organizer (with Ulrica Wilson and Brianna Donaldson) of AIM/ICERM Research Experiences for Undergraduate faculty (REUF) workshops, 2009, 2011-.

One-time events:

1. Chair of the Scientific Organizing Committee and Chair of the Local Organizing Committee, *ILAS 2017: Connections*, 21st ILAS Conference to be held at Iowa State University, July 24-28, 2017.
2. Banff International Research Station Focused Research Group, *The Inverse Eigenvalue Problem of a Graph*, BIRS, June 5-12, 2016, organizer with Shaun Fallat and Bryan Shader.

3. Chair of the local organizing committee, AMS Spring 2013 Central Section meeting, Iowa State University, April 27-28, 2013.
4. Banff International Research Station Focused Research Group, *Eventually Nonnegative Matrices and their Sign Patterns*, BIRS, May 15-22, 2011, organizer.
5. NSF-CBMS Regional Conference, *The Mutually Beneficial Relationship of Matrices and Graphs*, Iowa State University, July 12-16, 2010, with Bryan Shader; Richard Brualdi, principal lecturer.
6. Banff International Research Station workshop, *Theory and Applications of Matrices Described by Patterns*, organizer with Richard Brualdi, Pauline van den Driessche, Shaun Fallat, Bryan Shader, BIRS, Jan. 31-Feb 5, 2010.
7. IMA graduate summer program, *Linear Algebra and Applications*, Iowa State University, June 28-July 27, 2008, with organizer Jason Grout, Wolfgang Kliemann, and Y.T. Poon.
8. American Institute of Mathematics Structured Quartet Research Ensemble (SQuaRE), 2 year 8-person research group, *Minimum Rank of Symmetric Matrices described by a Graph*, AIM Feb. 2008, Feb. 2009, organizer.
9. American Institute of Mathematics Research Conference Center (ARCC), five day funded workshop, *Spectra of families of matrices described by graphs, digraphs, or sign patterns*, organizer with with Richard Brualdi and Bryan Shader, at AIM October 23-27, 2006.
10. Chair of the Organizing Committee, *Topics in Linear Algebra Conference*, Iowa State University, September 2002.

Member of Scientific Organizing Committee (last 5 years, in addition to those listed above)

1. 22nd ILAS Conference, to be held in Rio de Janeiro, July 2019.
2. 19th ILAS Conference, Seoul, South Korea, August 2014.

Organization of Special Sessions/Mini-symposia/non-ISU Seminars (last five years)

1. Special Session, “Discrete Structures: Analysis and Applications (IMA Reunion),” with Ryan Martin and Elisabeth Werner, AMS Fall Sectional, University of St. Thomas, Minneapolis, MN, October 28-30, 2016.
2. Mini-symposium, “Generalizations of the Strong Arnold Property and the Inverse Eigenvalue Problem of a Graph,” with Bryan Shader, 20th Annual ILAS Conference, July 11-15, 2016, Leuven, Belgium.
3. Mini-symposium, “Generalizations of positive matrices,” with Ulrica Wilson, SIAM Applied Linear Algebra Conference, Atlanta, October 2015.
4. Institute for Mathematics and its Applications (IMA) Annual Program Seminar, 2014-15, with Ryan Martin.

EDITORSHIPS

Associate Editor, *Linear Algebra and its Applications*, 2007-.

Associate Editor, *Electronic Journal of Linear Algebra*, 2011-.

Associate Editor, *Minnesota Undergraduate Mathematics Journal*, 2015-.

One of the editors of the special issue of *Linear Algebra and its Applications* 21st ILAS Conference Proceedings, Iowa State 2017.

One of the editors of the special issue of *Linear Algebra and its Applications* 438, 2013, 16th ILAS Conference Proceedings, Pisa 2010.

One of the editors of the special issue of *Linear Algebra and its Applications* 436, 2012, associated with the 2010 BIRS workshop Theory and applications of matrices described by patterns.

One of the editors of the special issue of *Linear Algebra and its Applications* 421(2-3), 2007, in honor of Miroslav Fiedler. Co-author of preface pp. 173-181 (with P. Butkovic, R. Nabben, Z. Strakos, M. Tuma).

PROFESSIONAL OFFICES, BOARDS, AND COMMITTEES

Member, Scientific Review Panel, Atlantic Association for Research in the Mathematical Sciences (AARMS), 2015-.

Secretary/Treasurer, International Linear Algebra Society. 2009-. (Assistant Secretary/Treasurer, 2006-2009.)

Member, Inaugural Selection Committee for the AWM Dissertation Prizes, 2016-2017.

Member, Association for Women in Mathematics Mentoring Travel Grant Committee, 2013-2015, chair 2015.

Member, Alice T. Schafer Prize Committee, Association for Women in Mathematics, 2008-2010; chair 2010.

Member, International Linear Algebra Society Nominating Committee, 2007.

Member, Hans Schneider Prize Committee, International Linear Algebra Society. 2007.

REFEREEING AND REVIEWING (last five years)

Grant Reviewing

mail review of NSERC proposal 2018

member of NSF panel 2017

member of NSF panel 2016

mail review of DAAD proposal 2016

mail review of NSF proposal 2014

Refereeing

Linear Algebra Appl. (1 in 2017, 2 in 2016, 2 in 2014)

Discrete Applied Math. (2 in 2018, 2 in 2017, 1 in 2016)

Discussiones Mathematicae Graph Theory (1 in 2017, 1 in 2014)

Electronic J. Linear Algebra (2 in 2014)

SIAM J. Optimization (1 in 2014)

Electronic Journal of Combinatorics (1 in 2014)

Discrete Mathematics (1 in 2016)

New York Journal of Mathematics (1 in 2015)

Discrete Mathematics, Algorithms and Applications (1 in 2015, 1 in 2014)

Australasian Journal of Combinatorics (1 in 2017)

Graphs Linear Algebra (1 in 2018)

Other

Member, External Review Team, Utah State University Department of mathematics and Statistics, 2018.

ADVISING AND DIRECTION OF POST-DOCTORAL ASSOCIATES, DOCTORAL & MASTER'S STUDENTS

Post-doctoral Sponsor

Name	Years	Employment
Dr. Jesse Geneson	2018-	
Dr. Michael Young	2010-2014	Assoc. Prof., Iowa State University
Dr. Minerva Catral	2009-2010	Assoc. Prof., Xavier University (Ohio)
Dr. Jason Grout	2007-2009	was Asst. Prof., Drake University, now Jupyter Developer, Bloomberg

Ph.D. Supervisor

Name	Major	Year	Employment	Co-supervisor
Michael Ross	Math	current		
Carolyn Reinhart	Math	current		
Beth Bjorkman	Math	current		
Joshua Carlson	Math	current		
Derek Young	Math	current		
Michael Dairyko	AMath	2018	Data Scientist, Milwaukee Brewers	M. Young
Chassidy Bozeman	Math	2018	Vis. Asst. Prof., St. Olaf College	
Xavier Martínez-Rivera	AMath	2017	Vis. Asst. Prof., Auburn	
Jephian Chin-Hung Lin	Math	2017	Asst. Prof., National Sun Yat-Sen U	S. Butler
Kevin Palmowski	AMath	2015	Data Scientist, SRC	
Nicole Kingsley	AMath	2015	Vis. Lect., Rochester Institute of Technology	
Brian Lois	AMath/EE	2015	Data Scientist, AT&T	N. Vaswani
Nathan Warnberg	Math	2014	Asst. Prof., U Wisconsin-LaCrosse	
Craig Erickson	Math	2014	Vis. Lect., Hamline U	
Steven Osborne	Math	2013	Workiva	S. Butler
Geoff Tims	Math	2013	Nationwide Insurance	
Travis Peters	Math	2012	Vis. Asst. Prof., St. Benedict's/St. John's	
Darren Row	Math	2011	Asst. Prof., St. Mary's U, MN	
Olga Pryporova (Kurth)	Math	2009	was Postdoc, U Connecticut	
Rana Mikkelson	Math	2008	was US Government	
Amy Wangsness (Wehe)	Math	2005	Professor, Fitchburg State U	

Master's Supervisor (thesis where indicated, otherwise creative component)

Name	Degree	Year	Co-Supervisor
Elizabeth Todd	MSM	2018	E. Stines
Michael Ross	Math	2018	
Adam Retzlaff	MSM	2017	E. Stines
AnnaVictoria Ellsworth	Math	2015	
Xavier Martínez-Rivera	Math	2014	
Nicole Kingsley	AMath	2014	
Arianne Ross	Math	2011	
Laura DeLoss (Hogrefe)	Math	2009 (thesis)	
Dan Sarasio Meyer	MSM	2008	
Olga Ruff	Math	2007	
Joyce Eveland	MSM	2006	H. Thompson
Jennifer Parker	MSM	2006	
Becky Atherton	MSM	2005	
Lesley Lamphier	MSM	2004	
Michele Funke	MSM	2002	
Sandra Nordstrom	Math	2002	
George Peters	Math	1995	R. Alexander
Daniel Carberry	Math	1995	
Rachel Lamp	Math	1990	
Joyati Chakraborty	Math	1985	

REU/Undergraduate Research Mentor: 40 students supervised**TEACHING** (last 5 years)

Math 207 Linear Algebra, <http://orion.math.iastate.edu/lhogben/math207.html>

Math 507/407 Applied Linear Algebra <http://orion.math.iastate.edu/lhogben/math507.html>

Math 510 Linear Algebra, <http://orion.math.iastate.edu/lhogben/math510.html>

Math 590 Independent study course

Math 599 Masters creative component

Math 610 Early Graduate Research, <http://orion.math.iastate.edu/lhogben/research/EGR.html>

Math 680F Combinatorial Matrix Theory

Math 699 Ph.D. thesis research

EDUCATIONAL/OUTREACH PUBLICATIONS**Textbooks**

1. *Elementary Linear Algebra* (text), West Publishing Co., 1987.

Chapters in Books

1. Canonical Forms, in *Handbook of Linear Algebra*, CRC Press, 2007. Updated in the 2nd edition, CRC Press, 2014.

Papers

1. L. Hogben, M. Hunacek. Review of *Linear algebra done right*, 3rd ed. *American Mathematical Monthly*, 123, 621–624, 2016.
2. L. Hogben, W. Kliemann. Review of *Applied Linear Algebra* by Olver and Shakiban. *American Mathematical Monthly*, 115(4): 373–378, 2008.
3. L. Hogben. The REU Experience at Iowa State University. *Proceedings of AMS NSA Conference Promoting Undergraduate Research in Mathematics*, American Mathematical Society, 2007.
4. J. Grout, L. Hogben. Your NSF Mathematical Sciences Institutes. *IMAGE* (Bulletin of ILAS) 39, 17–19, 2007.
5. L. Hogben, W. Kliemann. Review of *Applied Linear Algebra* by Olver and Shakiban. *American Mathematical Monthly*, 115(4): 373–378, 2008.
6. L. Hogben. ISU REU: diverse, research-intensive, team-based. *Involve* 7(3), 335–342 (Proceedings of the Trends in Undergraduate Research on the mathematical Sciences Conference 2012).
7. L. Hogben, U. Wilson. AIM's Research Experiences for Undergraduate Faculty (REUF) program. *Involve* 7(3): 343–353 (Proceedings of the Trends in Undergraduate Research on the mathematical Sciences Conference 2012).
8. L. Hogben, M. Hunacek. Review of *Linear Algebra Done Right* 4th ed., by S. Axler. *American Mathematical Monthly* 123, 621–624, 2016.

Workbooks

1. L. Hogben, K. Heimes. *Applications of Ordinary Differential Equations and Linear Algebra* (notes), 1991.
2. Editor, *Mathematics for Elementary School Teachers: Explorations for Iowa State University*, Houghton Mifflin, 1999, based on *Mathematics for Elementary School Teachers: Explorations* by Bassarear. Wrote about 80 pages of new material.

Computer Programs

1. R.K. Alexander, L. Hogben, R. Tondra *Phase Plane for Ordinary Differential Equations* (computer program), 1986.
2. I.R. Hentzel, L. Hogben, *Matrix Calculator* (computer program), CONDUIT, 1986.

EDUCATIONAL/OUTREACH LECTURES

Plenary Lectures

1. “Teaching Linear Algebra: Technology and Resources,” 3rd University Mathematics Courses Forum, Chengdu, China, November 2, 2007.

Invited Lectures and Presentations (last five years)

1. “Minimum Rank Problems,” Bates College, November 2013.
2. “EDGE@ISU: Mentoring clusters for graduate students,” MAA Session on Mentoring Graduate Students, Joint Mathematics Meetings, San Diego, January 11, 2013.
3. “A Large and Diverse REU: the Iowa State Approach,” *Trends in Undergraduate Research in the Mathematics Sciences (TURMS) Conference*, Chicago, October 2012.

DIVERSITY EFFORTS

- ISU Mathematics Department Director of Diversity: Lead a team of departmental faculty working to recruit and retain a diverse group of graduate students and post-doctoral associates, build faculty collaborations with minority-serving schools, work with other leaders of diversity efforts at ISU and nationally to enhance the diversity of the STEM workforce. The ISU Mathematics Department won the 2015 AMS Award for an Exemplary Program or Achievement in a Mathematics Department, partly based on diversity success.
- Associate Director for Diversity, American Institute of Mathematics (AIM).
- Co-organizer and/or mathematical leader of AIM/ICERM Research Experiences for Undergraduate faculty (REUF) workshops (see Research Conferences and Workshops Organized). More than 60% of the participants are women and more than 40% are at minority serving institutions.
- Leader of EDGE@ISU mentoring cluster for women graduate students, post-doctoral associates and junior faculty, <http://orion.math.iastate.edu/lhogben/EDGEatISU.html>.
- Participant in WATCOUS conference, University of Nebraska, June 8-10, 2017.
- Co-lead (with Prof. Mahamadi Warma) partnership between Departments of Mathematics at ISU and University of Puerto Rico, Rio Piedras Campus, 2009-2014.
- Lead organizer for the 2nd annual Iowa Mathematical Field of Dreams Conference held at ISU Nov. 8-9, 2008.