

CURRICULUM VITAE

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Date of Birth: January 30, 1948
Place of Birth: Salt Lake City, UT
Marital Status: Married
Name of Spouse: Thaylene
Number of Children: Five
Citizenship: United States

EDUCATION

Ph.D. 1975 Courant Institute of Mathematical Sciences, New York University

Thesis Advisor: Mark Kac of the Rockefeller University

PROFESSIONAL EXPERIENCE

Instructor, Department of Mathematics, University of Wisconsin-Madison, 1975 - 1977.

Assistant Professor, Department of Mathematics, Texas A & M University, 1977 - 1981.

Associate Professor, Department of Mathematics, Brigham Young University, 1981 - 1988.

Professor, Department of Mathematics, Brigham Young University, 1988 - 2003.

Chair, Department of Mathematics, Brigham Young University, 1997 - 2000

PROFESSIONAL SERVICE

Associate Editor, Linear Algebra and its Applications, October 1992-2003.

Editor (with Angelika Bunse-Gerstner and Nicholas Young) Volumes 223/224 of Linear Algebra and its Applications, Special Issue Honoring Miroslav Fiedler and Vlastimil Ptak, 746 pages, July 1995.

Editor (with Daniel Hershkowitz and Donald Robinson) Volume 150 of Linear Algebra and its Applications, Proceedings of the First Conference of the International Linear Algebra Society, 552 pages, May 1991.

Organizer, Minisymposium 3, Combinatorial and Algebraic Matrix Theory, Sixth SIAM Conference on Applied Linear Algebra, 29 October-1 November 1997, Snowbird, Utah.

Organizer, Minisymposium 6, Positive Semidefinite Matrices and Hermitian Matrices, Sixth SIAM Conference on Applied Linear Algebra, 29 October-1 November 1997, Snowbird, Utah.

Organizer, Minisymposium 6, Determinantal Inequalities and Matrix Completion Problems, Fourth SIAM Conference on Applied Linear Algebra, September 1991, Minneapolis, Minnesota.

Organizing Committee (with Daniel Hershkowitz, Charles R. Johnson, Hans Schneider, Robert C. Thompson), Inaugural Meeting of the International Linear Algebra Society, August 1989, Brigham Young University, Provo, Utah (85 participants and 60 speakers).

Referee: Linear Algebra and its Applications, Linear and Multilinear Algebra, SIAM Journal on Matrix Analysis and its Applications, Discrete Mathematics, International Conference on Algebra and its Applications, Czech Mathematics Journal

PUBLICATIONS

1. (with Mark Kac) On Some Modified Spherical Models, Proc. Nat. Acad. Sci. USA 72 (1975), 4723-4724.
2. An Intermediate Spherical Model of a Ferromagnet, Journal of Statistical Physics 16 (1977), 371-394.
3. (with Philip J. Feinsilver) Gaussian Families and a Theorem on Patterned Matrices, Journal of Applied Probability 15 (1978), 514-522.
4. An Alternative Approach to Laguerre Polynomial Identities in Combinatorics, Canadian Journal of Mathematics 31 (1979), 312-319.
5. A Theorem on Inverses of Tridiagonal Matrices, Linear Algebra and its Applications 27 (1979), 211-217.
6. Discussion on "Polymers as Self-Avoiding Walks," by Karl F. Freed, The Annals of Probability 9 (1981), 555-556.
7. (with Philip J. Feinsilver) Inverses of Banded Matrices, Linear Algebra and its Applications 41 (1981), 111-130.
8. (with Charles R. Johnson) Determinantal Formulae for Matrices with Sparse Inverses, Linear Algebra and its Applications 56 (1984), 73-88.
9. Toeplitz Matrices with Banded Inverses, Linear Algebra and its Applications 57 (1984), 131-145 (1984).
10. (with Charles R. Johnson) Possible Spectra of Totally Positive Matrices, Linear Algebra and its Applications 62 (1984), 231-233.
11. (with Charles R. Johnson) Spanning-Tree Extensions of the Hadamard-Fischer Inequalities, Linear Algebra and its Applications 66 (1985), 177-193.
12. (with Charles R. Johnson) Determinantal Formulae for Matrices with Sparse Inverses, II: Asymmetric Zero Patterns, Linear Algebra and its Applications 81 (1986), 237-261.
13. (with Rulon D. Pope) A Result on the Rank of Submatrices and an Economic Application, Economics Letters 23 (1987), 71-77.

14. (with Charles R. Johnson, D. D. Olesky and P. van den Driessche) Inherited Matrix Entries: Principal Submatrices of the Inverse, SIAM Journal on Algebraic and Discrete Methods 8 (1987), 313-322.
15. (with Kenneth Driessel) The Symmetric Eigenvalue Problem via an Isospectral Gradient Flow, in Report of the 1987 Utah State University Matrix Theory Conference, Linear Algebra and its Applications 104 (1988), 205-211.
16. (with Rodney Forcade and Andrew Pollington) On the Spectral Radius of a $(0,1)$ -Matrix Related to Mertens' Function, Linear Algebra and its Applications 107 (1988), 151-159.
17. (with Donald W. Robinson) The Jordan 1-Structure of a Matrix of Redheffer, Linear Algebra and its Applications 112 (1989), 57-73.
18. (with Charles R. Johnson) Matrix Completions, Determinantal Maximization and Maximum Entropy, Interface 88, Proceedings of the 20th Symposium on the Interface, Computationally Intensive Methods in Statistics, American Statistical Association, Alexandria, Virginia (1988), 546-552.
19. (with Charles R. Johnson and Michael Lundquist) Determinantal Formulae for Matrix Completions Associated with Chordal Graphs, Linear Algebra and its Applications 121 (1989), 265-289.
20. (with Donald W. Robinson and Daniel Hershkowitz) Report, Inaugural Conference of the International Linear Algebra Society, 12-15 August 1989, Brigham Young University, Provo, Utah, USA, Linear Algebra and its Applications 150 (1991), 463-550.
21. (with D. D. Olesky and P. van den Driessche) A Note on Eigenvalues of Fixed Rank Perturbations of Diagonal Matrices, Linear and Multilinear Algebra 30 (1991), 13-16.
22. (with Tyler J. Jarvis) Spectral Properties of a Matrix of Redheffer, Linear Algebra and its Applications 162-164 (1992), 673-683.
23. (with Charles R. Johnson) Majorization Monotonicity of Symmetrized Fischer Products, Linear and Multilinear Algebra 34 (1993), 67-74.
24. (with Charles R. Johnson) Determinantal Inequalities for Positive Definite Matrices, Discrete Mathematics 119 (1993), 97-106.
25. (with Charles R. Johnson and Pablo Tarazaga) The Real Positive Definite Completion Problem for a Simple Cycle, Linear Algebra and its Applications 192 (1993), 3-31.
26. (with Charles R. Johnson, Raphael Loewy, and Tamir Shalom) Rank Incrementation via Diagonal Perturbations, in Combinatorial and Graph Theoretical Problems in Linear Algebra ed. R. A. Brualdi, S. Friedland, V. Klee, Springer-Verlag (1993), 181-187.
27. (with Charles R. Johnson, Michael Lundquist and Hugo Woerdeman) Completing a Block Diagonal Matrix with a Partially Prescribed Inverse, Linear Algebra and its Applications 223/224 (1995), 73-87.

28. (with Charles R. Johnson and Raphael Loewy) The Real Positive Definite Completion Problem : Cycle Completability, Memoirs of the American Mathematical Society, 122 (584), July 1996, 71pp.
29. (with Michael Lundquist) Rank Inequalities for Positive Semidefinite Matrices, Linear Algebra and its Applications, 248 (1996), 91-100.
30. (with Charles R. Johnson and Raphael Loewy) Critical Graphs for the Positive Definite Completion Problem, SIAM Journal on Matrix Analysis and Applications, 20 (1998), 117-130.
31. (with H. Tracy Hall and Raphael Loewy) The Cone of Class Function Inequalities for the 4-by-4 Positive Semidefinite Matrices, Proceedings of the London Mathematical Society, (3) 79 (1999) 107-130.
32. (with H. Tracy Hall and Raphael Loewy) A Nonpolyhedral Cone of Class Function Inequalities for Positive Semidefinite Matrices, Linear Algebra and its Applications, 302-303 (1999) 535-553.
33. (with Mohammad Omran) The Real Positive Definite Completion Problem for a 4-cycle, Linear Algebra and its Applications 336 (2001), 131-166.
34. (with Stephen Pierce) Null Spaces of Correlation Matrices, Linear Algebra and its Applications 368 (2003), 129-157.
35. (with Raphael Loewy) Connected Graphs whose Minimal Rank is Two, (under revision)

OTHER SHORT ITEMS

1. It Had to be e!, Mathematics Magazine, 68 (1995), 15.
2. Dodgson's Identity, Linear Algebra Gems Project, Linear Algebra and its Applications - Assets for Undergraduate mathematics, The Mathematical Association of America MAA Notes #59, David Carlson, Charles R. Johnson, David C. Lay, A. Duane Porter, eds. (2002), 45-48.
3. The Cauchy-Binet Formula, Linear Algebra and its Applications - Assets for Undergraduate mathematics, The Mathematical Association of America MAA Notes #59, David Carlson, Charles R. Johnson, David C. Lay, A. Duane Porter, eds. (2002), 15-17.
4. Dodgson's Identity, Linear Algebra and its Applications - Assets for Undergraduate mathematics, The Mathematical Association of America MAA Notes #59, David Carlson, Charles R. Johnson, David C. Lay, A. Duane Porter, eds., (2002) 45-48.

ADDRESSES AT PROFESSIONAL MEETINGS 1990-2003

"Spectral Properties of a Matrix of Redheffer," March 1990, Directions in Matrix Theory, Auburn, Alabama.

"Combinatorial Analysis of a Matrix of Redheffer," Hour talk, May 1990, Analytic Number Theory Conference, Brigham Young University, Provo, Utah.

"Determinantal Inequalities for Positive Definite Matrices," Invited 30-minute talk, June 1990, Sixth Haifa Matrix Theory Conference, Haifa, Israel.

"Determinantal Inequalities," Invited hour talk, September 1990, Workshop on Generalized Matrix Function Inequalities, The College of William and Mary, Williamsburg, Virginia.

"Majorization Monotonicity of Symmetrized Fischer Products," May 1991, 2nd Northern Illinois University Conference on Linear Algebra, DeKalb, Illinois.

"Spectral Properties of a Matrix of Redheffer," Invited 30-minute talk, June 1991, Seventh Haifa Matrix Theory Conference, Haifa, Israel.

"The Positive Definite Completion Problem for Nonchordal Graphs," 25-minute talk in the Minisymposium, "Determinantal Inequalities and Matrix Completion Problems," September 1991, Fourth SIAM Conference on Applied Linear Algebra, Minneapolis, Minnesota.

"Spectral Properties of a Matrix of Redheffer," 25-minute talk in the Minisymposium, "Graph Theoretic Spectral Theory," September 1991, Fourth SIAM Conference on Applied Linear Algebra, Minneapolis, Minnesota.

"Determinantal Inequalities for Positive Definite Matrices," Invited 25-minute talk, October 1991, Symposium on Matrix Analysis and Applications, Western Michigan University, Kalamazoo, Michigan.

"Determinantal Inequalities for Positive Definite Matrices," Invited 25-minute talk, May, 1992, Matrix session of the annual meeting of the Israel Mathematical Union, Hebrew University, Jerusalem, Israel.

"The Real Positive Definite Completion Problem for Nonchordal Graphs," Invited half-hour talk, July 1992, Workshop on Matrix Theory, Universit"t Bielefeld, Bielefeld, Germany.

"The Real Positive Definite Completion Problem for Nonchordal Graphs: Cycle Completability," Invited 25 minute talk, March 1993, Third Conference of the International Linear Algebra Society, Pensacola, Florida.

"The Real Positive Definite Completion Problem: Cycle Completability (graph theoretic aspects)," Invited 25 minute talk, May 1993, Conference on Graphs and Matrices in honor of John Maybee's 65th birthday, Boulder, Colorado.

"The Real Positive Definite Completion Problem: Cycle Completability (matrix theoretic aspects)," Invited 25 minute talk, June 1993, Eighth Haifa Matrix Theory Conference, Haifa, Israel.

"The Real Positive Definite Completion Problem for a Simple Cycle," 25-minute talk in the Minisymposium, "Matrix Completions and Applications," August 1993, Third SIAM Conference on Linear Algebra: Signals, Systems, Control, Seattle, Washington.

"Positive Definite Matrices," Plenary 45-minute talk, August 1995, Fifth Conference of the International Linear Algebra Society, Atlanta, Georgia.

"The Real Positive Definite Completion problem for Nonchordal Graphs," Invited 40-minute talk, October 1996, Meeting of the American Mathematical Society, Chattanooga, Tennessee.

"Critical Graphs for the Positive Definite Completion Problem," 25-minute talk, November 1996, 10th Southern California Matrix Theory Meeting, Northridge, California.

"The Cone of Class Function Inequalities for Positive Semidefinite Matrices," 25 minute talk, Sixth SIAM Conference on applied Linear Algebra, 29 October-1 November 1997, Snowbird, Utah

"A Nonpolyhedral Cone of Class Function Inequalities," 20-minute talk, Southern California Matrix Theory Meeting, November, 1998, San Jose State University, San Jose, California.

"A Nonpolyhedral Cone of Class Function Inequalities," 20-minute talk, 1999 Utah State University Department of Mathematics and Statistics Miniconference: Combinatorial Matrix Theory, May 1999, Logan, Utah.

"The Cone of Class Function Inequalities for the Positive Semidefinite Matrices," 30 minute talk, Eleventh Haifa Matrix Theory Conference, June 1999, Haifa, Israel.

"The Cone of Class Function Inequalities for the Positive Semidefinite Matrices," 20 minute talk, Matrix Theory Symposium in Honor of Tom Markham, December 1999, University of South Carolina, Columbia, South Carolina.

"The Positive definite completion problem," one hour invited talk, Workshop on Partial Matrices and Completions, September 2000, University of Coimbra, Portugal.

"Some questions and observations in spectral graph theory," 40 minute talk, Matrix theory conference, May 2001, University of California-Northridge.

"Connected graphs whose minimal rank is two," 15 minute talk, Tenth Conference of the International Linear Algebra Society, June 2002, Auburn University, Auburn, Alabama.

"Symmetric Matrices and Combinatorial Matrix theory," Plenary hour talk, September 2003, Meeting on Linear Algebra and Applications, Universidade Nova de Lisboa - FCT, Caprica, Portugal.

ADDRESSES AT UNIVERSITIES 1990-2003

"Combinatorial Analysis of a Matrix of Redheffer," May 1990, Combinatorial Algorithms Group, University of Victoria, Victoria, British Columbia.

"Determinantal Identities and Inequalities," October, 1991, Institute for Mathematics and its Applications, Minneapolis, Minnesota.

"The Real Positive Definite Completion Problem for a Simple Cycle,"

December 1991, Institute for Mathematics and its Applications, Minneapolis, Minnesota.

January 1992, Matrix Theory Seminar, Technion-Israel Institute of Technology, Haifa, Israel.

April 1992, Operator Theory Seminar, Tel Aviv University, Tel Aviv, Israel.

"About a $(0,1)$ -Matrix related to the Riemann Conjecture," June 1992, Colloquium, University of Haifa, Haifa, Israel.

"Eigenvalues of a $(0,1)$ -Matrix in Number Theory," July 1992, Seminar in Numerische Mathematik, Universit"t Bielefeld, Bielefeld, Germany.

"Eigenvalues of Graphs," June 1996, Summer Program: Research Experiences for Under-graduates, The College of William and Mary, Williamsburg, Virginia.

TEACHING

Calculus, Numerical Analysis, Linear Algebra, Matrix Analysis, Honors Calculus, Complex Analysis, Differential Equations, Methods of Applied Mathematics, Combinatorics, Combinatorial Matrix Theory, Graph Theory, History of Mathematics, Topics in Graph Theory.

ASBYU-Blue Key Professor of the Month, October 1986.

Bluekey/BYUSA Professor of the Year, 1993-1994.

The Mathematical Association of America, Award for Distinguished College or University Teaching of Mathematics, Intermountain Section, 1995.

Karl G. Maeser Distinguished Teaching Award (one of three University wide awards), Brigham Young University, August 2002.

STUDENTS

Undergraduate honors theses:

Tyler J. Jarvis, An Investigation into the Eigenvalues of a Matrix of Redheffer, July 1989.

David A. Cardon, An Investigation of the Structure of a Matrix of Redheffer, November 1990.

Jeffrey S. Anderson, Graph-Theoretical Determination of an Upper Bound for Candidate Peptide

Sequences from Overlapping Fragments Generated by Endopeptidase Hydrolysis,
July, 1994

Master's theses:

Mohammad Omran, Determining the Number of Roots of a Real Polynomial inside the Unit Circle, December 1992.

Paul Johanson, A characterization of m -Trees and Partial m -Trees, April 1995.

H. Tracy Hall, Bounded Ratios of Principal Minors of Positive Definite Matrices, August 1998.

Steven Butler, Bounding the number of graphs containing very long induced paths, December 2002.

Marcia Riddle, Sandwich theorem and calculation of the theta function for several graphs, April 2003.

I have also supervised several Masters projects

Ph.D. Dissertations:

Mohammad Omran, The Positive Semidefinite Completion problem for Two Unspecified Entries, August 1997.

Nephi Noble, The Expansion of Graphs along Integer Eigenvalues, August 2002.

Department and College Service 1994-2000

Chair, Recruitment Committee, 1994-1996

Member, Advisory Committee, 1994-1997

Member, College Rank Advancement Committee, 1996-1997

Member, Recruitment Committee, 1996-1997

Department Chair, 1997-2000

Chair, Hiring Committee, 2000-2001

Chair, Calculus Committee, 2001-2003