

# Curriculum Vitae – February, 2011

## JEFFREY L. STUART

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## ACADEMIC EXPERIENCE:

### Pacific Lutheran University, Tacoma, Washington 2001 –

2007 – Professor of Mathematics  
2001 - 2007 Associate Professor of Mathematics (Tenured, Spring 2004)

### University of Southern Mississippi, Hattiesburg, Mississippi 1987 – 2001

1998 - 2001 Professor of Mathematics  
1991 - 1998 Associate Professor of Mathematics (Tenured, Spring 1992)  
1987 - 1991 Assistant Professor of Mathematics

### Northern Illinois University, Dekalb, Illinois 1986 – 1987

1986 - 1987 Visiting Assistant Professor of Mathematics

### University of Wisconsin, Madison, Wisconsin 1980 – 1986

Spring 1986 Research Assistant, Department of Mathematics  
1980 - 1985 Teaching Assistant, Department of Mathematics

## Sabbatical Positions

Fall 2006 Visiting Professor of Mathematics  
Department of Mathematics, Washington State University, Pullman, Washington

Spring 1999 Visiting Professor of Mathematics  
Department of Mathematical Sciences, University of West Florida, Pensacola, Florida

Fall 1998 Visiting Professor of Mathematics  
Department of Mathematics and Computer Science, Georgia State University  
Atlanta, Georgia

Fall 1991 Visiting Scholar, Special Year in Linear Algebra  
Institute for Mathematics and its Applications, University of Minnesota  
Minneapolis, Minnesota

## **EDUCATION:**

- 1986 Ph.D., Mathematics, University of Wisconsin, Madison  
Minor field of study: Computer Science  
Dissertation Title: "ZM-matrices and MM-matrices"  
Advisor: Professor Hans Schneider
- 1981 M.A., Mathematics, University of Wisconsin, Madison
- 1980 B.A., Magna Cum Laude, Mathematics and Physics, Pomona College, Claremont, California  
Thesis title: "A Numerical Solution for Acoustic Ray Paths in a Two Dimensional Ocean"

## **FIELDS OF GENERAL INTEREST:**

Matrix Theory, Graph Theory, Combinatorial Optimization, Statistics, Linear Algebra Education, Financial Risk

## **FIELDS OF CURRENT RESEARCH:**

Sign & Ray Pattern Matrices, Graph Connectivity Measures

## **HONORS:**

- 2004 K.T. Tang Excellence in Research Award, Pacific Lutheran University  
2001 Distinguished Teaching Award, Mississippi-Louisiana Section of the Mathematical Association of America  
2000 University Faculty Excellence in Teaching Award (University of Southern Mississippi)  
1980 National Science Foundation Fellowship Honorable Mention  
1980 Election to Phi Beta Kappa Honor Society, Pomona College  
1980 Distinction on Senior Exercises in Mathematics and Physics  
1980 Senior Physics Prize  
1979 Junior Prizes in Mathematics and Physics  
1976-80 Dean's List (eight semesters), Pomona College  
1976 National Merit Scholar

## **MEMBERSHIPS:**

Phi Beta Kappa  
International Linear Algebra Society  
Mathematical Association of America  
Society for Industrial and Applied Mathematics  
American Statistical Association

## **SOCIETY OF ACTUARIES EXAMS:**

Passed (1994): 100, 110, 130, 135, 140  
Passed (1995): 120, 121, 165  
Passed (1996): 151, 160  
Total Exam Hours: 16

## **LANGUAGES:**

Fluent in English and Spanish. Moderate command of German.

## SOFTWARE EXPERIENCE:

Extensive programming and teaching experience with MATLAB  
Teaching experience using SPSS, Calipso, MINITAB  
Extensive use of Scientific Workplace (MAPLE and LaTeX front end), HTML, Microsoft Access,  
Microsoft Word, Windows (95, 98, 2000, NT, XP, 7)

## PUBLICATIONS:

### *Refereed International Journals and Book Chapters*

1. J. Stuart, "The Drazin generalized inverse of a singular MMA-matrix", *Linear and Multilinear Algebra* 22 (1987) 75-85.
2. J. Stuart, "The decomposition of idempotents associated with inflators", *Linear Algebra and its Applications* 97 (1987) 171-184.
3. J. Stuart "Eigenvectors for inflation matrices and inflation-generated matrices", *Linear and Multilinear Algebra* 22 (1988) 249-265.
4. J. Stuart, "Inflation matrices and ZME-matrices which commute with a permutation matrix", *SIAM Journal on Matrix Analysis and Applications* Vol. 9, No. 3 (1988) 408-418.
5. J. Stuart, "An infinite family of matrix inequalities with ZME-matrix coefficients", *Linear Algebra and its Applications* 108 (1988) 141-156.
6. H. Schneider and J. Stuart, "Allowable spectral perturbations for ZME-matrices", *Linear Algebra and its Applications* 111 (1988) 62-118.
7. J. Stuart, "Matrices whose powers are completely reducible Z-matrices", *Linear and Multilinear Algebra* 25 (1989) 75-83.
8. J. Stuart, "An eigenvector test for inflation matrices and ZME-matrices", *SIAM Journal on Matrix Analysis and Applications* Vol.10, No. 4 (1989) 520-532.
9. J. Stuart, "The partial order graph for a ZME-matrix" *Linear Algebra and its Applications* 141 (1990) 123-152.
10. J. Stuart, "The determinant of a Hessenberg L-matrix", *SIAM Journal on Matrix Analysis and Applications* 12 (1991) 7-15.
11. J. Stuart and J. Weaver, "Matrices that commute with a permutation matrix", *Linear Algebra and its Applications*, 150 (1991) 255-265.
12. J. Stuart and J. Weaver, "Diagonally scaled permutations and circulant matrices", *Linear Algebra and its Applications* 212 (1994) 397-411.
13. S. Friedland, R. Hemasinha, H. Schneider, J. Stuart and J. Weaver, "Row sums and inverse row sums for nonnegative matrices", *SIAM Journal on Matrix Analysis and Applications* Vol. 15, No.4 (1994) 1157-1166.
14. J. Stuart and D. Sitton, "Packing complete graphs into complete multipartite graphs", *Congressus Numerantium*, 118 (1996) 3-22.
15. J. Stuart and J. Weaver, "Fiedler matrices and their factorization", *Linear Algebra and its Applications* 275 (1998) 579-594.

16. J. Stuart, "A polynomial time spectral decomposition test for certain classes of inverse M-matrices", *Electronic Linear Algebra* 3 (1998) 129-141.
17. J. Stuart, C. Eschenbach and S. Kirkland, "Irreducible sign k-potent sign pattern matrices", *Linear Algebra and its Applications*, 294 (1999) 85-92.
18. J. Stuart, "Reducible sign k-potent sign pattern matrices", *Linear Algebra and its Applications*, 294 (1999) 197-211.
19. C. Eschenbach, F. Hall, R. Hemasinha, S. Kirkland, Z. Li, B. Shader, J. Stuart and J. Weaver, "Almost regular tournament matrices", *Linear Algebra and its Applications*, 306 (2000) 103-121.
20. C. Eschenbach, F. Hall, R. Hemasinha, S. Kirkland, Z. Li, B. Shader, J. Stuart and J. Weaver, "Properties of tournaments among well-matched players", *American Mathematical Monthly*, 107 (10) (2000) 881-892.
21. J. Stuart, "Eigenvectors: Fixed vectors and fixed directions (discovery exercises)", in Linear Algebra Gems, D. Carlson, C. Johnson, D. Lay and D. Porter, eds., Mathematical Association of America, New York, 2001, 71–73..
22. J. Stuart, L. Beasley and B. Shader, "Irreducible, pattern k-potent ray pattern matrices", *Linear Algebra and Its Applications*, 346 (2002) 261 – 271.
23. Z. Li, F. Hall and J. Stuart, "Irreducible, powerful ray pattern matrices", *Linear Algebra and Its Applications*, 342 (2002) 47-58.
24. J. Stuart, "Reducible pattern k-potent ray pattern matrices", *Linear Algebra and Its Applications*, 362 (2003) 87-99
25. R. Hemasinha, S. Kirkland, J. Stuart and J. Weaver, "Properties of the Brualdi-Li tournament matrix", *Linear Algebra and Its Applications*, 361 (2003) 63-73.
26. J. Stuart, "Shake a stick at ill-conditioning", in F. Uhlig, "Report on the 10<sup>th</sup> ILAS Conference "Challenges in Matrix Theory" at Auburn University in June 2002", *Linear Algebra and Its Applications*, 379 (2004) 517-520.
27. R. Hasfura-Buenaga, A. Holder and J. Stuart, "Asymptotic stability of the optimal partition", *Linear Algebra and Its Applications*, 394 (2005) 145-167.
28. J. Stuart, Review essay on four linear algebra textbooks, *American Mathematical Monthly*, 2005 Monthly, 112 (3) (2005) 281-288.
29. F. Hall, Z. Li and J. Stuart, "Reducible, powerful ray patterns", *Linear Algebra and Its Applications*, 399 (2005) 125-140.
30. J. Stuart, "Digraphs and Matrices", book chapter in the Handbook of Linear Algebra, Leslie Hogben, ed., Chapman and Hall -- CRC Press, 2007.
31. J. McDonald and J. Stuart, "Spectrally arbitrary ray patterns", *Linear Algebra and Its Applications*, 429 (2008) 727-734.
32. K. Griffin, J. Stuart, and M. Tsatsomeros, "A family of noncirculant Toeplitz matrices all of whose powers are Toeplitz matrices", *Czech Mathematics Journal*, 58 (2008) 1185 -1193.
33. B. Finnie, L. Gibson, J. Stuart and F. Zabriski, "Balancing environmental and industry Sustainability: a case study of the U.S. gold mining industry", *J. Environmental Management*, 90 (2009) 3690 - 3699.
34. J. Stuart, "The eavesdropping number", *Czech Journal of Mathematics*, 59 (134) (2009) 623–636.

35. J. Stuart and J. Weaver, "Voting Matrices and Tie Breaking", *International Journal of Pure and Applied Mathematics*, 54 (No. 3) (2009) 437–470.
36. Q. Li, B. Liu and J. Stuart, "Bounds on the  $k^{\text{th}}$  generalized base of a primitive sign pattern matrix", *Linear and Multilinear Algebra*, 58 (2010) 355–366.
37. J. Stuart, "Building generalized inverses of matrices using only row and column operations", *International Journal of Mathematical Education in Science and Technology*, (2010) iFirst, 1–12.
38. J.-S. Jeon, J. McDonald and J. Stuart, "The minimum upper bound on the first ambiguous power of an irreducible, nonpowerful sign or ray pattern," to appear, *Linear Algebra and Its Applications*.
39. J. Stuart, "Ray nonsingular hessenberg ray patterns", in preparation.
40. J.-S. Jeon, J. McDonald and J. Stuart, "Oscillatory and eventually ambiguous sign patterns and ray patterns", in preparation.
42. J. Stuart, "(m,k)-Pebbling", in preparation.

### ***Nonrefereed Publications***

1. "Eigenvalues, Generalized Eigenvectors and the Jordan Canonical Form for Inflation Matrices", Talk summary published in the conference report for second Utah State University Matrix Theory Conference: *Linear Algebra and its Applications* 104 (1988) 237-239.
2. "Reducible ZM- and MM-matrices", Talk summary published in the conference report for the University of Victoria Combinatorial Matrix Theory Conference: *Linear Algebra and its Applications* 107 (1988) 349-354.
3. "Hessenberg L-matrices", Talk summary published in the conference report for the Sixth Haifa Matrix Theory Conference: *Linear Algebra and its Applications*, 167 (1992) 261-265.
4. Book Review, "Matrix Theory and Applications", C. R. Johnson, ed., *SIAM Review* 33 (1991) 511-512.
5. "Conference Report on the Third Conference of ILAS, Pensacola, Florida, March 1993", joint with J. Weaver, *Linear Algebra and its Applications*, 212/213 (1994) 547-551.
6. "Using MATLAB to encourage formation of conjectures by students", *Proceedings of the Fifth SIAM Conference on Applied Linear Algebra*, J. Lewis, ed., SIAM, Philadelphia, 1994, 538-542.
7. "An explicit characterization of matrices whose norms induced by symmetric gauge functions are permutation invariant", *Mississippi Academy of Sciences Report*, 95-1 (1995) 25 - 29.
8. "Easing into eigenvectors in introductory linear algebra", *Mississippi Academy of Sciences Report*, 96-1 (1996) 33 - 43.
9. "Polytopic structure for classes of Fiedler matrices", joint with J. Weaver, *Mississippi Academy of Sciences Report*, 97-1 (1997) 61-73.
10. ILAS Treasurer's Report, *IMAGE – Bull. International Linear Algebra Society*, 26 (2001) 27-29.
11. ILAS Treasurer's Report, *IMAGE – Bull. International Linear Algebra Society*, 28 (2002) 4.
12. ILAS Treasurer's Report, *IMAGE – Bull. International Linear Algebra Society*, 30 (2003) 5.

13. "Powers of ray pattern matrices", Conference proceedings of the SIAM Conference on Applied Linear Algebra, July, 2003, at <http://www.siam.org/meetings/la03/proceedings/stuartjl.pdf> .
14. ILAS Treasurer's Report, IMAGE – Bull. International Linear Algebra Society, 32 (2004) 7.
15. ILAS Treasurer's Report, IMAGE – Bull. International Linear Algebra Society, 34 (2005) 6.
16. "Letter to teachers from the (AP Calculus) Reading", Newsletter of the North Carolina Association of Advanced Placement Mathematics Teachers, Volume 13, Number 2 (2005) 7-8.
17. "Greetings from Fort Collins – Another letter to teachers from the (AP Calculus) Reading", Newsletter of the North Carolina Association of Advanced Placement Mathematics Teachers, Volume 14, Number 2 (2006) 5-7.
18. ILAS Treasurer's Report, IMAGE – Bull. International Linear Algebra Society, 36 (2006) 11.
19. "How bad can your data be? Convexity and Variance Maximization", Proceedings of the American Statistical Association, Statistical Computing Section [CD-ROM], Alexandria, VA: American Statistical Association: xx-xx+3.
20. ILAS Treasurer's Report, IMAGE – Bull. International Linear Algebra Society, 38 (2007) 4.
21. Book Review: "The Unknown Quantity" by John Derbyshire, IMAGE – Bull. International Linear Algebra Society, 38 (2007) 13-14.
22. ILAS Treasurer's Report, IMAGE – Bull. International Linear Algebra Society, 40 (2008) 12.
23. ILAS Treasurer's Report, IMAGE – Bull. International Linear Algebra Society, 42 (2009) 14.
24. "Sustainability: The Case of Gold", joint with Bruce Finnie and Linda Gibson, Encyclopedia of the Earth (<http://www.eoearth.org/>), February, 2010.
25. "Government is spiraling into debt that can't be sustained", joint with Bruce Finnie and Linda Gibson, Tacoma News Tribune, March 31, 2010.
26. Book Review: "Introductory Combinatorics" by Richard Brualdi, IMAGE – Bull. International Linear Algebra Society, 44 (2010), 27.

### ***American Mathematical Monthly Problems Solved***

10831 (2001)  
 11028 (2003)  
 11224 (2006)  
 11239 (2006)  
 11379 (2008)  
 11422 (2009)  
 11487 (2010)  
 11530 (2011) with Roger Horn

### ***Mathematics Magazine Problems Solved***

1774 (2007)  
 1789 (2008)  
 1856 (2010)

## PROFESSIONAL PRESENTATIONS:

### ***Conferences:***

1. "Products of commuting MMA-matrices" at the SIAM Second Applied Linear Algebra Conference, Raleigh, North Carolina, April, 1985.
2. "Eigenvalues, Generalized Eigenvectors and the Jordan Canonical Form for Inflation Matrices" at the second Utah State University Matrix Theory Conference, Logan, Utah, January 1987.
3. "Reducible ZM- and MM-matrices" at the University of Victoria Combinatorial Matrix Theory Conference, Victoria, British Columbia, May, 1987.
4. "Inflation matrices which commute with permutation matrices" at the SIAM Third Applied Linear Algebra Conference, Madison, Wisconsin, May, 1988.
5. "A characterization of reducible ZM- and MM-matrices" at the SIAM Third Applied Linear Algebra Conference, Madison, Wisconsin, May, 1988.
6. "Partial Order Graphs for MMA-matrices" at the Southeast International Conference on Combinatorics, Graph Theory and Computation, Boca Raton, Florida, February, 1989.
7. "Matrices that commute with a permutation matrix" at the International Linear Algebra Society Inaugural Conference, Provo, Utah, August, 1989.
8. "Matrices that commute with a generalized permutation matrix" at the Directions in Matrix Theory Conference, Auburn, Alabama, March, 1990.
9. "Determinants of Hessenberg L-matrices" at the sixth Haifa Matrix Theory Conference, Haifa, Israel, June, 1990.
10. "Powers of N0-matrices", at the second Northern Illinois University Conference on Linear Algebra, Numerical Linear Algebra and Applications, DeKalb, Illinois, May, 1991.
11. "Partially zero Jordan Chains", at the SIAM Fourth Applied Linear Algebra Conference, Minneapolis, Minnesota, September, 1991.
12. "Predicting inverse row sums via row sums", Louisiana-Mississippi section, Mathematical Association of America, annual conference, Biloxi, Mississippi, February, 1993.
13. "Spectra of five banded Toeplitz matrices", International Linear Algebra Society, Linear Algebra: The New Generation, Pensacola, Florida, March, 1993.
14. "Using MATLAB to teach numerical linear algebra", Louisiana-Mississippi section, Mathematical Association of America, annual conference, Nichols State University, Thibodaux, Louisiana, March, 1994.
15. "Using MATLAB to encourage formation of conjectures by students", at the Fifth SIAM Conference on Applied Linear Algebra, Snowbird, Utah, June, 1994.
16. "Matrix software: From calculator to student laboratory", at the AMS-MAA joint meeting, San Francisco, California, January, 1995.
17. "An explicit characterization of matrices whose norms induced by symmetric gauge functions are permutationally invariant", at the Mississippi Academy of Sciences Annual Meeting, Biloxi, Mississippi, February, 1995.

18. "Induced norms, symmetric gauge functions and permutation invariance", at the Louisiana-Mississippi section, Mathematical Association of America, annual conference, Biloxi, Mississippi, March, 1995.
19. "A kinder, gentler approach to eigenvectors and eigenvalues", at the Fifth ILAS Conference, Atlanta, Georgia, August, 1995.
20. "Maximum coverings of complete, multipartite graphs using complete graphs", at the Southeast International Conference on Combinatorics, Graph Theory and Computation, Baton Rouge, Louisiana, February, 1996.
21. "Easing into eigenvectors and eigenvalues in introductory linear algebra", at the Mississippi Academy of Sciences Annual Meeting, Jackson, Mississippi, February, 1996.
22. "Maximum coverings of complete, multipartite graphs using complete graphs", at the Mississippi Academy of Sciences Annual Meeting, Jackson, Mississippi, February, 1996.
23. "Easing into eigenvectors in introductory linear algebra", at the Louisiana-Mississippi section, Mathematical Association of America, annual conference, Baton Rouge, Louisiana, March, 1996.
24. "Packing complete graphs into complete, multipartite graphs", at the Cumberland Combinatorics and Graph Theory Conference, Oxford, Mississippi, May, 1996.
25. "Sign patterns that have unambiguous powers", at the Sixth ILAS Conference, Chemnitz, Germany, August, 1996.
26. "Qualitative matrix theory: sign patterns and invertibility" at the University of South Alabama – University of Southern Mississippi Joint Miniconference, Hattiesburg, Mississippi, February, 1997.
27. "Polytopic structure for classes of Fiedler matrices", at the Mississippi Academy of Sciences Annual Meeting, Biloxi, Mississippi, February, 1997.
28. "Factorizations of Fiedler Matrices", at the Louisiana-Mississippi section, Mathematical Association of America, annual conference, Jackson, Mississippi, February, 1997.
29. "Sign k-potent sign pattern matrices", at the Mississippi Academy of Sciences Annual Meeting, Biloxi, Mississippi, February, 1998.
30. "Sign k-potent sign pattern matrices", at the Seventh ILAS Conference, Madison, Wisconsin, June, 1998.
31. "Tournaments: Easy questions, hard answers", at the Florida Section, of the Mathematical Association of America, annual conference, Panama City, Florida, March, 1999.
32. "Diagonalizability of tournaments", at the SIAM Annual Meeting, Atlanta, Georgia, May, 1999.
33. "Tournaments: Easy questions, hard answers", at the Colorado-Wyoming Matrix and Graph Theory Miniconference, Denver, Colorado, June, 1999.
34. "Walk spaces of certain classes of tournaments", at the Eighth ILAS Conference, Barcelona, Spain, July, 1999.
35. "Tournaments – Easy Questions, Hard Answers", at the University of South Alabama – University of Southern Mississippi Joint Miniconference, Mobile, Alabama, February, 2000.
36. "Pattern k-potent ray pattern matrices" at the Mississippi Academy of Sciences Annual Meeting, Biloxi, Mississippi, February, 2000.
37. "Tournaments: Easy questions, hard answers", at the Mississippi-Louisiana Section, of the Mathematical Association of America, annual conference, Lafayette, Louisiana, February, 2000.

38. "Pattern k-potent ray pattern matrices", at the SIAM Seventh Conference on Applied Linear Algebra, Raleigh, North Carolina, October, 2000.
39. "Shake a stick at ill-conditioning" at the AMS-MAA Joint Meeting, New Orleans, January, 2001.
40. "Asymptotic stability of the optimal partition" at the Ninth ILAS Conference, Haifa, Israel, June, 2001.
41. "Powerful ray pattern matrices" at the Western Canada Linear Algebra Meeting, Regina, Canada, May, 2002.
42. "Adventures in graph theory" at the Pacific Northwest Sectional Meeting of the MAA, Portland, Oregon, June, 2002.
43. "Shake a stick at ill-conditioning" at the Ninth ILAS Conference, Auburn, Alabama, July 2002.
44. "(m,n)-pebbling of graphs" at the Pacific Northwest Sectional Meeting of the MAA, Walla Walla Washington, June, 2003.
45. "Reducible, powerful ray patterns" at the SIAM Conference on Applied Linear Algebra Williamsburg, Virginia, July, 2003.
46. "Ray patterns, ray determinants and ray nonsingularity", Directions in Combinatorial Matrix Theory, Banff, Alberta, Canada, May, 2004.
47. "Ray patterns, ray determinants and ray nonsingularity", Eleventh ILAS Conference, Coimbra, Portugal, July, 2004.
48. "A simple classroom demonstration of ill-conditioning", at the Pacific Northwest Sectional Meeting of the MAA, Tacoma, Washington, April, 2005.
49. "Ray patterns, ray determinants and inversion", Special Session on Combinatorial Matrix Theory AMS Central Section Meeting, Lincoln, Nebraska, October, 2005.
50. "Trends in Linear Algebra Texts in the United States", Thirteenth ILAS Conference, Amsterdam, the Netherlands, July, 2006.
51. "How bad can your data be? Variance maximization and convexity", poster presentation, Joint Statistics Meeting, Seattle, Washington, August, 2006.
52. "Noncirculant Toeplitz matrices all of whose positive powers are Toeplitz matrices", Fourteenth ILAS Conference, Shanghai, China, July, 2007.
53. "Eavesdropping on graphs", AMS session on combinatorics, Joint Math Meeting, San Diego, California, January, 2008.
54. "Appropriate use of WeBWorK, WebAssign and Maple in Calculus I and II", NSF poster session, Joint Math Meeting, San Diego, California, January, 2008.
55. "Spectrally arbitrary ray patterns", Fifteenth ILAS Conference, Cancun, Mexico, June, 2008.
56. "Appropriate use of WeBWorK, WebAssign and Maple in Calculus I and II", NSF poster session, Joint Math Meeting, Washington, DC, January, 2009.
57. "Teach ill-conditioning to introductory linear algebra students in a single lecture!", MAA Session on Innovative and Effective Ways to Teach Linear Algebra, Joint Math Meeting, Washington, DC, January, 2009.

58. "Teach ill-conditioning in a single lecture!", Special Session on Teaching Numerical Analysis, MAA Math Fest, Portland, OR, August, 2009.
59. "Math Placement at a Selective Liberal Arts University", Short Course on Math Placement, MAA Math Fest, Portland, OR, August, 2009.
60. "Inverses for matrices that do not have inverses", MAA Session on Innovative and Effective Ways to Teach Linear Algebra, Joint Math Meeting, San Francisco, CA, January, 2010.
61. "Inverses for matrices that do not have inverses", Session on Pedagogical Gems, MAA Pacific Northwest Section Meeting, Seattle, WA, April, 2010.
62. "Graphs, Patterns and Powers .From Nonnegative Matrices to Nonpowerful Ray Patterns", minisymposium on nonnegative matrices, Sixteenth ILAS Conference, Pisa, Italy, June, 2010.

***Invited Talks and Colloquia:***

1. "M-matrices and their powers", University of Puerto Rico at Rio Piedras, San Juan, Puerto Rico, February, 1986.
2. "M-matrices and their powers", St. Lawrence University, Canton, New York, March, 1986.
3. "M-matrices and their powers", College of William and Mary, Williamsburg, Virginia, April, 1986.
4. "M-matrices and their powers", Northern Illinois University, DeKalb, Illinois, April, 1986.
5. "M-matrices and their powers", University of Southern Mississippi, February, 1987.
6. "Powers of matrices", Biological Sciences Graduate Student Association Invitational Colloquium, University of Southern Mississippi, Hattiesburg, Mississippi, October, 1987.
7. "The inflation product: a new tool for matrix construction", University of West Florida, Pensacola, Florida, April, 1989.
8. "Matrices that commute with a permutation matrix", Eastern Tennessee State University, Johnson City, Tennessee, November, 1989.
9. "How big is infinity?", Kappa Mu Epsilon Colloquium, University of West Florida, Pensacola, Florida, March, 1991.
10. "Inflation (Double-Crossed?)", Institute for Mathematics and its Applications, University of Minnesota, Minneapolis, Minnesota, December, 1991.
11. "Circulants and their generalizations", California State University at Fresno, Fresno, California, April 1995.
12. "Matrices whose structure is preserved by powers", Georgia State University, Atlanta, Georgia, February 1996.
13. "Qualitative matrix theory: sign patterns, invertibility and other matrix properties", Texas Tech University, Lubbock, Texas, March, 1997.
14. "How big is infinity?", Texas Tech University, Lubbock, Texas, March, 1997.
15. "Qualitative matrix theory: sign patterns, invertibility and other matrix properties", University of Colorado, Denver, Colorado, July, 1997.

16. "Solving cubic and higher order equations", Texas Tech University, Lubbock, Texas, March, 1998.
17. "Some inflated results", Texas Tech University, Lubbock, Texas, March, 1998.
18. "Why good students get bad AP Calculus scores", University of Southern Mississippi, Hattiesburg, Mississippi, July, 1998.
19. "Tournaments", Georgia State University, Atlanta, Georgia, August, 1998.
20. "Matlab – A Tutorial", State University of West Georgia, Carrollton, Georgia, October, 1998.
21. "Matlab – A Tutorial", University of Southern Mississippi, Hattiesburg, Mississippi, January, 1999.
22. "Why good students get bad AP Calculus scores", University of Southern Mississippi, Hattiesburg, Mississippi, March, 1999.
23. "Tournaments: Easy questions, hard answers", Trinity University, San Antonio, Texas, October, 1999.
24. "Why good students get bad AP Calculus scores", Mississippi Council of Teachers of Mathematics, Annual Conference, Hattiesburg, Mississippi, November, 1999.
25. "Matrices with displacement structure", Scientific Computing Seminar Series, University of Southern Mississippi, Hattiesburg, Mississippi, January, 2000.
26. "Tournaments: Easy questions, Hard answers", Texas Tech University, Lubbock, Texas, March, 2000.
27. "The Lovasz-Winkler stopping time algorithm for hidden Markov processes", The Rocky Mountain Mathematics Consortium Summer Workshop on Probabilistic Combinatorics, University of Wyoming, Laramie, Wyoming, June, 2000.
28. "Sign patterns, ray patterns and invertibility", Trinity University, San Antonio, Texas, February, 2001.
29. "Robbing stagecoaches, eavesdropping and other adventures in graph theory", Trinity University, San Antonio, Texas, February, 2001.
30. "Tournaments: Easy questions, Hard answers", Pacific Lutheran University, Tacoma, Washington, February, 2001.
31. "Robbing stagecoaches, eavesdropping and other adventures in graph theory", Pacific Lutheran University, Tacoma, Washington, September, 2001.
32. "Qualitative matrix theory – Sign patterns and ray patterns", Portland Area Graph Theory and Combinatorics Seminar, Portland, Oregon, February, 2002.
33. "Thinking outside and inside the box – Two views of optimization (Part I)", Pacific Lutheran University, Tacoma, Washington, September, 2002.
34. "Tournaments: How to tell the winners from the losers", University of Puget Sound, Tacoma, Washington, October, 2002.
35. "How unlucky can you get?", Pacific Lutheran University, Tacoma, Washington, February, 2003.
36. "MathSciNet: Your search begins here", Pacific Lutheran University, Tacoma, Washington, September, 2004.
37. "Robbing stagecoaches and listening to other people's phone conversations", Washington State University, Pullman, Washington, September, 2006.

38. "From Perron-Frobenius to Google PageRank", Washington State University, Pullman, Washington, October, 2006.
39. "How strong is your graph?", Pacific Lutheran University, Tacoma, Washington, February, 2007.
40. "Insurance models for environmental risks", Interdisciplinary Seminar in Risk, Pacific Lutheran University, Tacoma, Washington, February, 2007.
41. "Inverses for matrices that don't have inverses", Pacific Lutheran University, Tacoma, Washington, September, 2008.
42. "The math placement system at PLU", Pacific Lutheran University, Tacoma, Washington, March, 2010.
43. "Graphs, patterns and powers – from nonnegative matrices to nonpowerful ray patterns", Minisymposium on Nonnegative Matrices, 16<sup>th</sup> ILAS Meeting, Pisa, Italy, June, 2010.

## SOFTWARE CODE

M-files Posted to Mathworks website: <ftp://ftp.mathworks.com/contrib/> : linear programming solver (simplex method): v4/optim/lpsolver/ and v5/optim/linprog/ ; combinatorial toolbox: /math/randmat/ and /math/signs.m; block-diagonal matrix construction tools: /linalg/bdiag.m and /linalg/rbdiag.m

## GRANTS

Co-author with Bryan Dorner and Daniel Heath, "Adapting WeBWork Internet-Based Gateway Exams and Maple PowerTools to Introduce Appropriate Use of Technology in the First Two Semesters of Calculus", National Science Foundation, funded for \$141,600 for three years beginning September, 2003.

## SERVICE TO PROFESSION:

Ex-Officio Member, Executive Board of the International Linear Algebra Society (ILAS), 2009 – 2010

Secretary – Treasurer, ILAS, 2000 – 2009 (three 3-year terms)

Assistant Treasurer, ILAS, 1992 – 2000

Member, ILAS Education Committee, ILAS, 1996 – 2002

Web Administrator, ILAS Education Resources Web Site, 1997 – 2002

Vice President, Mississippi Chapter, American Statistical Association, 2000 – 2001.

Member, Organizing Committee, Fifteenth ILAS Conference, Cancun, Mexico, 2008.

Member, Organizing Committee, Seventh ILAS Conference, Madison, Wisconsin, 1998.

Member, Organizing and Local Arrangements Committees, ILAS Conference - "Linear Algebra: The New Generation", Pensacola, Florida, 1993.

Organizer, special session, "Pedagogical Gems", MAA Pacific Northwest Section meeting, Seattle, Washington, April, 2010.

Co-organizer, minisymposium, "Interactive linear algebra texts", at the Seventh ILAS Conference, Madison, Wisconsin, 1998.

Co-organizer, minisymposium, "Centrosymmetric matrices and their generalizations" at the SIAM Fourth Applied Linear Algebra Conference, Minneapolis, Minnesota, 1991.

Session chair at twelve mathematical conferences, 1988 - 2009.

Editor, *Advances in Pure Mathematics*, 2011 –

Editor, Special Issue (2008 ILAS Conference) for *Linear Algebra and its Applications*.

Editor, *Transactions*, Division of Mathematics, Computer Science and Statistics, Mississippi Academy of Sciences, 1996 and 1997.

Participant, ATLAST Advanced MATLAB Educational Applications Development Workshop, University of California at San Diego, June 1994.

Reader, Educational Testing Service Advanced Placement Calculus Exam, 1998 - 2001, 2005 - 2006

Regular Respondent, AP Calculus and AP Statistics Newsgroups and MATLAB user group, 1998 –

#### Referee:

60 papers for *Linear Algebra and its Applications*.

12 papers for *Linear and Multilinear Algebra*.

7 papers for *SIAM Journal on Matrix Analysis*.

1 paper for *Journal of Combinatorial Theory - Series B*.

3 papers for *Electronic Journal of Linear Algebra – ELA*

1 paper for *Journal of Computational and Applied Mathematics*

1 paper for *Acta Mathematica Sinica*

1 paper for *International Journal of Mathematics and Mathematical Sciences*

1 paper for *AMATYC Review*

1 paper for *MAA Monthly*

4 papers for *Discrete Mathematics*

2 papers for *Linear Algebra in Signals, Systems and Control*, edited by B.N. Datta, et al., 1988.

#### Reviews:

20 article reviews for *AMS Math Reviews*.

1 book review for *SIAM Review*.

8 pre-publication textbook reviews

3 federal grant proposals

External Expert Consultant on one National Science Foundation Grant, 2009

## **COURSES TAUGHT**

### **Pacific Lutheran University (2001 – 2011)**

Math 107 Mathematics Explorations (Math for Liberal Arts) (2x)  
Math 128 Linear Models and Calculus (Math for Business) (7x)  
Math 140 Pre-calculus (5x)  
Math 151 Calculus I (2x)  
Math 152 Calculus II (8x)  
Math 230 Matrix Algebra (half semester)  
Math 240 Introduction to Probability (half semester)  
Math 253 Multivariable Calculus  
Math 331 Linear Algebra (15x)  
Math 341 Mathematical Statistics (3x)  
Math 342 Probability Theory (2x)  
Math 348 Regression and ANOVA  
Math 356 Numerical Analysis  
Math 381 Problem Solving Seminar  
Math 381 Math Modeling Seminar  
Math 411 Mathematics of Risk (Introduction to Mathematical Finance) (3x)  
Math 455 Mathematical Analysis (3x)  
Math 491 Special Topics: Financial Mathematics  
Math 499 Capstone Seminar

### **University of Southern Mississippi (1987 – 2001)**

College Algebra (Experimental "Reform" section) (2x)  
Trigonometry (6x)  
Calculus (3 hour - "Traditional") I  
Calculus (3 hour - CCH "reformed" calculus) I (2x), II  
Calculus (5 hour - "Traditional") I (2x), II (2x)  
Multivariable Calculus (CCH "reformed" calculus)  
Discrete Math  
Introductory Matrix Theory (4x)  
Linear Algebra I (3x), II (4x)  
Combinatorics  
Graph Theory (2x)  
Linear Programming (5x)  
Nonlinear Optimization (3x)  
Numerical Analysis I (2x), II (2x)  
Mathematical Probability and Statistics I (4x), II (4x)  
Advanced Calculus I (2x), II (2x)  
Graduate Topics: Numerical Methods for Matrix Theory (4x)  
Graduate Topics: Combinatorics

### **Georgia State University, Atlanta (Fall, 1998)**

Linear Algebra II

### **University of West Florida, Pensacola (Spring, 1999)**

Set Theory and Logic

### **Northern Illinois University (1986 – 1987)**

Finite Mathematics (2x)  
Linear Algebra (2x)

### **University of Wisconsin Madison (1980 – 1985)**

Calculus I (3x), II, III (2x)  
Business Calculus I (2x), II (2x)  
College Algebra  
Algebra and Trigonometry

## PLU Senior Capstone Projects

I have directed 29 senior capstone projects at PLU. Topic distribution: graph theoretic topics, (6); matrix theoretic topics, (4); statistical topics (8); combinatorics, (1); and mathematical finance, (10).

Matthew Gabelle "Developing Algorithms for Finding Hamiltonian Cycles in Complete, Multipartite Graphs", May, 2002.

Jennifer Makenas "Ramsey Theory", May, 2002.

Dawn Schoenenberger "The Optimal Pebbling Number for Various Graphs", May, 2002

Lora Hendrickson "The Four Color Theorem", December, 2002

Bjorn Larsen "Who is #1? Ranking Round Robin Tournaments", May 2003

Darrel Rohar "An Introduction to Subspace Iteration and the QR Algorithm", May, 2003

Reid Wiggins "Shortest Path Algorithms", May, 2003

Kathy Kellog, "AR(p) Models in Time Series", May, 2004

Matthew Honstain, "Logistic Regression and Categorical Data Analysis", May, 2004

Charles Dorner, "Generalizations of Pascal's Triangle", May, 2004

Chester Boyles, "Generalized Inverses and Least Squares", May, 2005

Leanna Christian, "Multivariate Statistical Analysis: Applications to Tourist Preferences", May, 2005

Mark Oliver, Markov Chains, May, 2006

Shandra Crosby, "Improved Confidence Intervals for Binomial Probabilities", May, 2006

Bryce Ageno, "The Traveling Salesman Problem", May, 2007

David Pedack, "Options Pricing and the Black-Scholes Merton Model", May, 2007

Ingrid Stegemoeller, "Surveys and Stratified Sampling", May, 2007

Tony McCarthy, "Probability, Blackjack and Card Counting", December, 2007

Richard King, "Financial Time Series and ARIMA Models", December, 2008

Tom Swenson, "Optimal Portfolio Theory", May, 2009

Kimberly Wheeler, "Applied Statistics: An Examination of Correlation with an Application at the Washington Department of Licensing", May, 2009

Charlette Knott, "Methodology of the Russell Indexes", August, 2009

Briet Johnson, "Measuring Honduran Microfinance Institution Efficiency Using Principal Component Analysis", May, 2010.

Michael Manser, "Fixed Income Fixes: Duration, Convexity and Immunization", May, 2010.

Brian McFadden, "Futures and Forwards, Rebalatization and Hedging", May, 2010.

Ben Perry, "Forecasting Financial Asset Returns Using Markov-Switching Models to Forecast U.S. Microcap Stock Returns, May, 2010.

Justin Peterson, "Approximating Return Attribution", May, 2010.

Xiaoqian Zhang, "The Capital Asset Pricing Model and the Fama French Model", May, 2010.

Pu Zheng, "The Black-Litterman Model", December 2010.

## **PLU Independent Study Courses**

I have directed three independent study courses at PLU:

Reid Wiggins, Math 433 (Abstract Algebra), Spring 2003

Darrel Rohar, Math 331 (Linear Algebra), Summer-Fall 2003

Oanh Hoang, Richard King and Tony McCarthy, Math 391 (Financial Mathematics), Spring 2007

Nicholas Carabello, Math 331 (Linear Algebra), Spring 2010

## **Student Research, Senior Theses and Masters Theses at USM**

I directed three undergraduate student research projects at USM. The first project was in linear complementarity, and it led to student paper session presentations at one regional and one national conference. The second was in graph theory, and led to an honors thesis and five student paper presentations at regional conferences. The third was in combinatorial matrix theory, and led to one student presentation at a regional conference. I co-directed a master's thesis on interior point methods for linear programming. I also directed a master's level research project at USM on homotopy methods for the computation of eigenvalues that led to two student presentations at regional conferences. I directed one undergraduate reading course: Probability and Statistics I.

David Sitton, "Maximum Matchings for Complete, Multipartite Graphs", Honors Thesis, May, 1995.

Allen Holder, "Three Interior Point Methods and Their Performance on Small, Dense Problems", Masters Thesis, December, 1993.

## **SERVICE AT PACIFIC LUTHERAN UNIVERSITY**

### **For the University**

Math Placement Director, May, 2004 – July, 2006, June 2008 – June 2010

Five year recalibration of PLU mathematics placement system, statistics project conducted jointly with Professor Emeritus Michael Dollinger, June – July, 2004

Member, Provost's ad-hoc Committee on International Student Success, 2011

Member, School of Education and Movement Studies Dean Search Committee, 2010 – 2011

Member, Steering Committee for the Morken Center, 2004 – 2006

### **For the Division of Natural Sciences**

Chair, Biostats Course Development Committee 2010 –

Member, Academic Festival Committee, 2002 – 2005

### **For the Mathematics Department**

Department Chair, July 2010 --

Acting Department Chair, June 2006, November 2009 – January 2010

Chair, curriculum committee, 2005 – 2006, 2009 – 2010

Member, assessment committee, 2002 – 2005

Financial Mathematics advisor, 2008 –

Statistics advisor, 2005 – 2009

Actuarial Science advisor, 2001 –

Advisor for majors, freshmen

Member, NSF grant proposal development Committee, 2002 – 2003

Math seminar coordinator, 2001 – 2003

Member, search committee, 2001 – 2002, 2007 – 2008, 2008 – 2009

Participant, Maple and WeBWork workshops, 2004, 2005, 2006, 2007

High school science fair judge, 2005

### **For the School of Business**

Member, Masters in Finance Program Development Committee 2010 --

Member, Finance Search Committee, 2005 – 2006, 2006 – 2007

Co-Developer, with Professor Bruce Finnie, of the Financial Mathematics Major

### **Other**

Member, Choral Union, 2001 – 2006, 2008 –

## SERVICE AT THE UNIVERSITY OF SOUTHERN MISSISSIPPI

### For the University:

Member, Faculty Summer Grant Proposal Review Committee, 1999, 2000  
Member, Teaching, Learning and Technology Advisory Committee, 1997 – 1998  
Member, USM Team, Regional Teaching, Learning and Technology Roundtable Workshop, 1996  
Member, University Parking Task Force, 1992 – 1994  
Chair, Parking Policy Revision Committee, 1992 – 1994  
Member, Faculty Senate, 1992  
Member, University Honors Committee, 1990  
Member, Undergraduate Admissions and Credits Review Committee, 1988 – 1991  
Advisor, USM Chapter, Phi Sigma Pi National Honor Fraternity, 1996 – 1998  
Advisor, USM Cycling Club, 1992 – 1994  
Member, University Symphony Chorus, 1987 – 2000

### For the College of Science & Technology (CoST):

Chair, CoST Faculty Summer Grant Proposal Review Committee, 1990, 1993, 1999, 2000  
Member, Scientific Computing Curriculum Committee, 1999 – 2001  
Member, School of Mathematical Sciences Council, 1995 – 1998  
Member, CoST Teaching and Learning Task Force, 1995 – 1996  
Mentor, CoST Freshman Mentor - Mentee Program, 1994 – 1996  
Judge, Regional Science Fair, 1989

### For the Department of Mathematics:

Chair, Promotion Committee for Dr. Redfern, 1999 – 2000  
Chair, Graduate Curriculum Committee, 1988 - 1998, 1999 – 2001  
Chair, Honors Committee, 1992 – 1994, 1995 – 1997, 2000 – 2001  
Chair, Math Achievement Award Committee, 1995 – 1996  
Member, Computer Advisory Committee, 1999 – 2001  
Member, Faculty Search Committee, 1997 – 1998  
Member, Math & Computer Science Statistics Coordinating Committee, 1995  
Member, Math Achievement Award Committee, 1988 – 1990, 1994 – 1995, 1999 – 2001  
Member, Calculus Committee, 1994  
Member, Prerequisites Committee, 1994  
Member, Teaching Effectiveness Committee, 1989 – 1993  
Member, Chair Search Coordinating Committee, 1990  
Member, Honors Committee, 1988 – 1990, 2000 – 2001  
Member, Textbook Committees for various courses  
Advisor, Kappa Mu Epsilon, 1994 – 1996  
Speaker, nine Mathematics Department Undergraduate Colloquia

I regularly advised undergraduate math majors, and I chaired and served on a number of master's committees.

## **GRADUATE COURSE WORK**

(Except as noted, courses taken at the University of Wisconsin, Madison)

### ***Algebra***

- 741. Abstract Algebra I
- 742. Abstract Algebra II
- 743. Matrix Theory
- 744. Algebraic Graph Theory
- 745. Group Theory
- 746. Rings and Modules
- 841. Finite Reflection Groups
- 841. Topics in Matrix Theory
- 843. Lie Algebras I
- 843. Lie Algebras II
- 875. Combinatorics

(Taken at Northern Illinois University, DeKalb, Illinois)  
NIU 660. Linear Systems and Control

(Taken at University of Southern Mississippi, Hattiesburg, Mississippi)  
USM 684. Network Reliability

### ***Analysis and Topology***

- 722. Complex Analysis
- 751. Topology I
- 752. Topology II
- 753. Algebraic Topology I
- 763. P-adic Analysis
- 801. Asymptotic Analysis
- 825. Functional Analysis

(Taken at Claremont Graduate School, Claremont, California)  
CGS 331. Real Analysis I  
CGS 332. Real Analysis II

### ***Computer Science***

- CS 525. Linear Programming
- CS 719. Network Flows
- CS 720. Integer Programming
- CS 725. Nonlinear Programming Theory and Applications
- CS 726. Advanced Nonlinear Programming Theory
- CS 767. Graph Theory Algorithms

## REFERENCES:

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Department of Mathematics and Statistics  
University of West Florida  
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