Kurt M. Anstreicher

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University of Iowa
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Education

9/78 - 8/82 Stanford University, Stanford CA
Ph.D. Operations Research, September 1983
Thesis: *Generation of Feasible Descent Directions in Continuous Time Linear Programming*
Advisor: George B. Dantzig

9/74 - 12/77 Dartmouth College, Hanover NH
B.A. Mathematics, magna cum laude with distinction, June 1978

Employment

8/91 - 7/23 University of Iowa, Iowa City IA
Professor of Business Analytics
Professor of Computer Science (by courtesy)
Professor of Industrial Engineering (by courtesy)
Professor of Applied Mathematics and Computational Science (affiliated faculty)

9/82 - 6/91 Yale University, New Haven CT
Assistant/Associate Professor of Operations Research

1/78 - 7/78 Ford Motor Company SCI Research Laboratory, Dearborn MI
Scientific Programmer

Courses Taught

University of Iowa

MBA/MSBA (Teaching Rating, 1-6 Scale)
Statistical Methods F91 (5.7), S92$^{\text{TV}}$(5.7), F92$^{\text{TV}}$(5.7), S93 (5.8), F93$^{\text{TV}}$(5.6),F93$^{\text{EX}}$(5.9), S94 (5.5), F94$^{\text{EX}}$(5.5), S95 (5.8), F95$^{\text{EX}}$(4.9)
Business Analytics F95 (5.9), F97 (5.3), S98$^{\text{PM}}$(5.1), F98 (5.7), S99$^{\text{PM}}$(5.6), F99 (5.4), F99$^{\text{EX}}$(4.3), F00$^{\text{EX}}$(5.6), S01$^{\text{PM}}$(5.0), S02$^{\text{EX}}$(5.7), S02$^{\text{PM}}$(4.6), F02$^{\text{EX}}$(5.2), S06$^{\text{PM}}$(5.0), F06$^{\text{PM}}$(5.4), F07$^{\text{EX}}$(5.6), F08$^{\text{PM}}$(5.6), F09$^{\text{HK}}$(4.6), F09$^{\text{PM}}$(5.1), F10$^{\text{HK}}$(5.3), F11$^{\text{PM}}$(5.0), F12$^{\text{EX}}$(5.6), S14$^{\text{EX}}$(5.8), F14$^{\text{HK}}$(5.3), S16$^{\text{EX}}$(5.5), S18$^{\text{EX}}$(5.1), F18 (4.4), F19$^{\text{EX}}$(5.7), F19$^{\text{PM}}$(5.3), S22$^{\text{PM}}$(4.9), F22 (5.6)
Advanced Analytics S00 (5.9), F00$^{\text{EX}}$(4.6), F01$^{\text{EX}}$(5.9), F02$^{\text{EX}}$(5.9), S03 (5.8), F03$^{\text{EX}}$(5.8), S04$^{\text{EX}}$(6.0), F04$^{\text{EX}}$(4.8), S05 (6.0), S07 (6.0), S17$^{\text{PM}}$(4.8), S19 (4.7)
Applied Optimization S18$^{\text{PM}}$(5.1), F18$^{\text{PM}}$(4.8), S19$^{\text{PM}}$(5.0), S21$^{\text{ON}}$(5.4), F21$^{\text{PM}}$(5.8), F22$^{\text{ON}}$(5.7)

EX = Executive, HK = Hong Kong, ON = Online, PM = Evening Program, TV= Televised

Yale University

MBA (Teaching Rating, 1-7 Scale)
Quantitative Analysis for Management Decisions F82 (6.7), F83 (6.6), F84 (6.7)
Data Analysis and Statistics S85 (6.1), S86 (6.7), S87 (6.7), S88 (6.6)

Undergraduate
Introduction to Management Science F88, F90
Stochastic Models S83, S84

Doctoral
Linear Programming F83, F88, F90
Nonlinear Programming S83, S84, S85, S87
Mathematical Programming Seminar F84, F87

Doctoral Theses Supervised

R.A. Bosch, Yale University, 1991
Partial Updating in Interior-Point Methods for Linear Programming

M.H.C. Fampa, Federal University of Rio de Janeiro, 1996 (with C.C. Gonzaga)
Semidefinite Programming: Algorithm and Application to the Maximum-Entropy Remote Sampling Problem

N.W. Brixius, University of Iowa, 2000
Solving Large-Scale Quadratic Assignment Problems (Winner, D.C. Spriestersbach award for outstanding dissertation in the Mathematical and Physical Sciences and Engineering, University of Iowa, 2002. Finalist, Council of Graduate Schools/University Microfilms International Distinguished Dissertation Award, 2002.)

J.W. Van Laarhoven, University of Iowa, 2010 (with J. Ohlmann)
Exact and Heuristic Algorithms for the Euclidean Steiner Tree Problem.

H. Dong, University of Iowa, 2011 (with S. Burer)
Copositive Programming: Separation and Relaxations.

K. Park, University of Iowa, 2023 (with S. Burer)
Advances in Convex Relaxations for Quadratic Optimization.

Refereed Publications

[1] K.M. Anstreicher, "A Monotonic Projective Algorithm for Fractional Linear Programming," *Algorithmica* 1 (1986), 483-498.

[2] K.M. Anstreicher, "A Strengthened Acceptance Criterion for Approximate Projections in Karmarkar's Algorithm," *Operations Research Letters* 5 (1986), 211-214.

[3] K.M. Anstreicher and U.G. Rothblum, "Using Gauss-Jordan Elimination to Compute the Index, Generalized Nullspaces, and Drazin Inverse," *Linear Algebra and Its Applications* 85 (1987), 221-239.

[4] K.M. Anstreicher, "Linear Programming and the Newton Barrier Flow," *Mathematical Programming* 41 (1988), 367-373.

[5] K.M. Anstreicher, "A Combined Phase I–Phase II Projective Algorithm for Linear Programming," *Mathematical Programming* 43 (1989), 209-223.

[6] K.M. Anstreicher, "The Worst-Case Step in Karmarkar's Algorithm," *Mathematics of Operations Research* 14 (1989), 294-302.

[7] K.M. Anstreicher, "A Standard Form Variant, and Safeguarded Linesearch, for the Modified Karmarkar Algorithm," *Mathematical Programming* 47 (1990), 337-351.

[8] K.M. Anstreicher, "Dual Ellipsoids and Degeneracy in the Projective Algorithm for Linear Programming," in *Mathematical Developments Arising from Linear Programming*, J.C. Lagarias and M. Todd, editors, *AMS Contemporary Mathematics* 114 (1990), 141-149.

[9] K.M. Anstreicher, "On the Performance of Karmarkar's Algorithm Over a Sequence of Iterations," *SIAM Journal on Optimization* 1 (1991), 22-29.

[10] K.M. Anstreicher, "On Monotonicity in the Scaled Potential Algorithm for Linear Programming," *Linear Algebra and Its Applications* 152 (1991), 223-232.

[11] K.M. Anstreicher, "A Combined Phase I – Phase II Scaled Potential Algorithm for Linear Programming," *Mathematical Programming* 52 (1991), 429-439.

[12] K.M. Anstreicher and R.A. Bosch, "Long Steps in an $O(n^3L)$ Algorithm for Linear Programming," *Mathematical Programming* 54 (1992), 251-265.

[13] K.M. Anstreicher, J. Lee, and T. Rutherford, "Crashing a Maximum–Weight Complementary Basis," *Mathematical Programming* 54 (1992), 281-294.

[14] K.M. Anstreicher, "On Interior Algorithms for Linear Programming with no Regularity Assumptions," *Operations Research Letters* 11 (1992), 209-212.

[15] R.A. Bosch and K.M. Anstreicher, "On Partial Updating in a Potential Reduction Linear Programming Algorithm of Kojima, Mizuno, and Yoshise," *Algorithmica* 9 (1993), 184-197.

[16] K.M. Anstreicher and P. Watteyne, "A Family of Search Directions for Karmarkar's Algorithm," *Operations Research* 41 (1993), 759-767.

[17] K.M. Anstreicher, D. den Hertog, C. Roos, and T. Terlaky, "A Long–Step Barrier Method for Convex Quadratic Programming," *Algorithmica* 10 (1993), 365-382.

[18] K.M. Anstreicher, "Strict Monotonicity and Improved Complexity in the Standard Form Projective Algorithm for Linear Programming," *Mathematical Programming* 62 (1993), 517-535.

[19] Y. Ye and K.M. Anstreicher, "On Quadratic and $O(\sqrt{n}L)$ Convergence of a Predictor–Corrector Algorithm for LCP," *Mathematical Programming* 62 (1993), 537-551.

[20] K.M. Anstreicher and T. Terlaky, "A Monotonic Build–Up Simplex Algorithm for Linear Programming" *Operations Research* 42 (1994), 556-561.

[21] K.M. Anstreicher and J.-Ph. Vial, "On the Convergence of an Infeasible Primal–Dual Interior–Point Method for Convex Programming," *Optimization Methods and Software* 3 (1994), 273-283.

[22] K.M. Anstreicher and R.A. Bosch, "A New Infinity–Norm Path Following Algorithm for Linear Programming," *SIAM Journal on Optimization* 5 (1995), 236-246.

[23] R.A. Bosch and K.M. Anstreicher, "A Partial Updating Algorithm for Linear Programs with Many More Variables than Constraints," *Optimization Methods and Software* 4 (1995), 243-257.

[24] K.M. Anstreicher, "On Long Step Path Following and SUMT for Linear and Quadratic Programming," *SIAM Journal on Optimization* 6 (1996), 33-46.

[25] K.M. Anstreicher, "Large Step Volumetric Potential Reduction Algorithms for Linear Programming," *Annals of Operations Research* 62 (1996), 521-538.

[26] K.M. Anstreicher, "Volumetric Path Following Algorithms for Linear Programming," *Mathematical Programming* 76 (1997), 245-263.

[27] K.M. Anstreicher, "On Vaidya's Volumetric Cutting Plane Method for Convex Programming," *Mathematics of Operations Research* 22 (1997), 63-89.

[28] K.M. Anstreicher and M. Fampa, "A Long-Step Path Following Algorithm for Semidefinite Programming Problems," in *Topics in Semidefinite and Interior-Point Methods*, P.M. Pardalos and H. Wolkowicz, eds., *The Fields Institute for Research in Mathematical Sciences Communications Series*, American Mathematical Society, Providence, R.I. (1998), 181-196.

[29] K.M. Anstreicher, "Towards a Practical Volumetric Cutting Plane Method for Convex Programming," *SIAM Journal on Optimization* 9 (1999), 190-206.

[30] K.M. Anstreicher, J. Ji, F.A. Potra and Y. Ye, "Probabilistic Analysis of an Infeasible-Interior-Point Algorithm for Linear Programming," *Mathematics of Operations Research* 24 (1999), 176-192.

[31] K.M. Anstreicher, "Ellipsoidal Approximations of Convex Sets based on the Volumetric Barrier," *Mathematics of Operations Research* 24 (1999), 193-203.

[32] K.M. Anstreicher, M. Fampa, J. Lee, and J. Williams, "Using Continuous Nonlinear Relaxations to Solve Constrained Maximum-Entropy Sampling Problems," *Mathematical Programming* 85 (1999), 221-240.

[33] K.M. Anstreicher, "Linear Programming in $O([n^3/\ln n]L)$ Operations," *SIAM Journal on Optimization* 9 (1999), 803-812.

[34] K.M. Anstreicher, X. Chen, H. Wolkowicz, and Y. Yuan, "Strong Duality for a Trust-Region Type Relaxation of the Quadratic Assignment Problem," *Linear Algebra and Its Applications* 301 (1999), 121-136.

[35] K.M. Anstreicher, "The Volumetric Barrier for Semidefinite Programming," *Mathematics of Operations Research* 25 (2000), 365-380.

[36] K.M. Anstreicher and H. Wolkowicz, "On Lagrangian Relaxation of Quadratic Matrix Constraints," *SIAM Journal on Matrix Analysis and Applications* 22 (2000), 41-55.

[37] K.M. Anstreicher and M.H. Wright, "A Note on the Augmented Hessian When the Reduced Hessian is Semidefinite," *SIAM Journal on Optimization* 11 (2001), 243-253.

[38] K.M. Anstreicher, "Eigenvalue Bounds Versus Semidefinite Relaxations for the Quadratic Assignment Problem," *SIAM Journal on Optimization* 11 (2001), 254-265.

[39] K.M. Anstreicher, M. Fampa, J. Lee, and J. Williams, "Maximum-Entropy Remote Sampling," *Discrete Applied Mathematics* 108 (2001), 259-274.

[40] K.M. Anstreicher and N.W. Brixius, "A New Bound for the Quadratic Assignment Problem Based on Convex Quadratic Programming," *Mathematical Programming* 89 (2001), 341-357.

[41] N.W. Brixius and K.M. Anstreicher, "Solving Quadratic Assignment Problems Using Convex Quadratic Programming Relaxations," *Optimization Methods and Software* 16 (2001), 49-68.

[42] K.M. Anstreicher, N.W. Brixius, J.-P. Goux and J. Linderoth, "Solving Large Quadratic Assignment Problems on Computational Grids," *Mathematical Programming* 91 (2002), 563-588. Winner, SIAG/OPT Prize for Best Paper in Optimization, 2002.

[43] K.M. Anstreicher, "Improved Linear Programming Bounds for Antipodal Spherical Codes," *Discrete and Computational Geometry* 28 (2002), 107-114.

[44] K.M. Anstreicher, "Improved Complexity for Maximum Volume Inscribed Ellipsoids," *SIAM Journal on Optimization* 13 (2003), 309-320.

[45] K.M. Anstreicher "Recent Advances in the Solution of Quadratic Assignment Problems," *Mathematical Programming, Series B* 97 (2003), 27-42.

[46] K.M. Anstreicher, "The Thirteen Spheres: A New Proof," *Discrete and Computational Geometry* 31 (2004), 613-625.

[47] K.M. Anstreicher, "The Volumetric Barrier for Convex Quadratic Constraints," *Mathematical Programming* 100 (2004), 613-622.

[48] K.M. Anstreicher and S. Burer, "D.C. Versus Copositive Bounds for Standard QP," *Journal of Global Optimization* 33 (2005), 299-312.

[49] M. Fampa and K.M. Anstreicher, "An Improved Algorithm for Computing Steiner Minimal Trees in Euclidean d-Space," *Discrete Optimization* 5 (2008), 530-540.

[50] K.M. Anstreicher, "Semidefinite Programming versus the Reformulation-Linearization Technique for Nonconvex Quadratically Constrained Quadratic Programming," *Journal of Global Optimization* 43 (2009), 471-484.

[51] K.M. Anstreicher and L.A. Wolsey, "Two 'Well-Known' Properties of Subgradient Optimization," *Mathematical Programming Series B* 120 (2009), 213-220.

[52] S. Burer, K.M. Anstreicher and M. Dür, "The Difference between 5×5 Doubly Nonnegative and Completely Positive Matrices," *Linear Algebra and its Applications* 431 (2009), 1539-1552.

[53] K.M. Anstreicher and S. Burer, "Computable Representations for Convex Hulls of Low-Dimensional Quadratic Forms," *Mathematical Programming, Series B* 124 (2010), 33-43.

[54] H. Dong and K.M. Anstreicher, "A Note on '5×5 Completely positive matrices'," *Linear Algebra and its Applications* 433 (2010), 1001-1004.

[55] K.M. Anstreicher, "Interior-point Algorithms for a Generalization of Linear Programming and Weighted Centring," *Optimization Methods and Software* 27 (2012), 605-612.

[56] K.M. Anstreicher, "On Convex Relaxations for Quadratically Constrained Quadratic Programming," *Mathematical Programming Series B* 136 (2012), 233-251.

[57] H. Dong and K.M. Anstreicher, "Separating Doubly Nonnegative and Completely Positive Matrices," *Mathematical Programming* 137 (2013), 131-153.

[58] J.W. Van Laarhoven and K.M. Anstreicher, "Geometric Conditions for Euclidean Steiner Trees in $\Re^d$," *Computational Geometry: Theory and Applications* 46 (2013), 520-531.

[59] S. Burer and K.M. Anstreicher, "Second-Order-Cone Constraints for Extended Trust-Region Subproblems," *SIAM Journal on Optimization* 23 (2013), 432-451.

[60] K.M. Anstreicher, "An Approach to the Dodecahedral Conjecture Based on Bounds for Spherical Codes," in *Discrete Geometry and Optimization*, K. Bezdek, A. Deza and Y. Ye, eds., *Fields Institute Communications* 69 (2013), 33-44.

[61] K.M. Anstreicher, "Kronecker Product Constraints with an Application to the Two-Trust-Region Subproblem," *SIAM Journal on Optimization* 27 (2017), 368-378.

[62] B. Yang, K. Anstreicher and S. Burer, "Quadratic Programs with Hollows," *Mathematical Programming Series A* 170 (2018), 541-553.

[63] K.M. Anstreicher, "Maximum-Entropy Sampling and the Boolean Quadric Polytope," *Journal of Global Optimization* 72 (2018), 603-618.

[64] K.M. Anstreicher "Efficient Solution of Maximum-Entropy Sampling Problems," *Operations Research* 68 (2020), 1826-1835.

[65] K.M. Anstreicher, "Testing Copositivity via Mixed-Integer Linear Programming," *Linear Algebra and its Applications* 609 (2021), 218-230.

[66] K.M. Anstreicher and S. Burer, "Quadratic Optimization with Switching Variables: The Convex Hull for $n = 2$," *Mathematical Programming Series B* 188 (2021), 421-441.

[67] K.M. Anstreicher, S. Burer and K. Park, "Convex Hull Representations for Bounded Products of Variables," *Journal of Global Optimization* 80 (2021), 757-778. Honorable Mention for *JOGO* Best Paper in 2021.

[68] K.M. Anstreicher, "Solving Two-Trust-Region Subproblems using Semidefinite Optimization with Eigenvector Branching," to appear in *Journal of Optimization Theory and Applications* (2023).

Publications in Edited Books

[69] K.M. Anstreicher, J. Ji, F.A. Potra and Y. Ye, "Average Performance of a Self–Dual Interior Point Algorithm for Linear Programming," in *Complexity in Numerical Optimization*, P. Pardalos, ed., World Scientific (Singapore, 1992), 1-15.

[70] K.M. Anstreicher, "Potential Reduction Algorithms," in *Interior Point Methods of Mathematical Programming*, T. Terlaky, ed., Kluwer, 1996, 125-158.

[71] K.M. Anstreicher, "Interior Point Methods for LP: Introduction," in *The Encyclopedia of Optimization*, C. Floudas and P. Pardalos, eds., Kluwer, 2001; second edition 2009.

[72] K.M. Anstreicher, "Karmarkar Projective Algorithm for LP," in *The Encyclopedia of Optimization*, C. Floudas and P. Pardalos, eds., Kluwer, 2001; second edition 2009.

[73] N.W. Brixius and K.M. Anstreicher, "The Steinberg Wiring Problem," in *The Sharpest Cut, The Impact of Manfred Padberg and His Work*, M. Grötschel, ed., SIAM, 2004, 293-307.

Other Publications

[74] K.M. Anstreicher and G.B. Dantzig, "Solving Continuous Time Linear Programs," *Proceedings of the IEEE Large Scale Systems Symposium* (1982), 3-7.

[75] K.M. Anstreicher and U.G. Rothblum, "Computing the Index and Drazin Inverse Using the Shuffle Algorithm," *Linear Algebra and Its Applications* 80 (1986), 176-180 (Proceedings of the 1985 Haifa Conference on Matrix Theory).

[76] K.M. Anstreicher, "Progress in Interior Point Algorithms Since 1984," *SIAM News* 22 #2 (1989), 12-14.

[77] K.M. Anstreicher, M. Fampa, J. Lee, and J. Williams, "Continuous Relaxations for Constrained Maximum Entropy Sampling," in *Integer Programming and Combinatorial Optimization*, W.H. Cunningham, S.T. McCormick, and M. Queyranne, eds., *Lecture Notes in Computer Science* 1084 (1996), Springer-Verlag, 234-248 (Proceedings of the Fifth Conference on Integer Programming and Combinatorial Optimization, Vancouver, 1996).

[78] K.M. Anstreicher and J. Lee, "A Masked Spectral Bound for Maximum-Entropy Sampling," in *mODa 7 - Advances in Model-Oriented Design and Analysis*, A. di Bucchianico, H. Läuter and H.P. Wynn, eds., *Contributions to Statistics* (2004), Physica-Verlag, 1-12 (Proceedings of the 7th International Workshop on Model-Oriented Design and Analysis, Heeze, Netherlands, 2004).

[79] K.M. Anstreicher, "Musin's Proof of the Kissing Number in Dimension Four," *Oberwolfach Reports* 2 (2005), 79-81. (Proceedings of the workshop on Optimization and Applications, Mathematisches Forschungsinstitut, Oberwolfach, Germany, 2005.)

[80] K.M. Anstreicher and M. Fampa, "An Improved Algorithm for Computing Steiner Minimal Trees in $\Re^d$," *Oberwolfach Reports* 50 (2005), 2848-2850. (Proceedings of the workshop on Combinatorial Optimization, Mathematisches Forschungsinstitut, Oberwolfach, Germany, 2005.)

[81] K.M. Anstreicher, "Comparing Convex Relaxations for Quadratically Constrained Quadratic Programming," *Proceedings of the European Workshop on Mixed Integer Nonlinear Programming*, P. Bonami, L. Liberti, A.J. Miller and A. Sartenaer, eds., CIRM, Marseille, France (2010), 5-11.

[82] K.M. Anstreicher, "An Algorithm for Computing the CP-Factorization of a Completely Positive Matrix" *Oberwolfach Reports* 52 (2017), 9-11. (Proceedings of the workshop on Copositivity and Complete Positivity, Mathematisches Forschungsinstitut, Oberwolfach, Germany, 2017.)

[83] K.M. Anstreicher, "Efficient Solution of Maximum-Entropy Sampling Problems" *Oberwolfach Reports* 26 (2019), 11-14. (Proceedings of the workshop on Mixed-Integer Nonlinear Optimization, Mathematisches Forschungsinstitut, Oberwolfach, Germany, 2019.)

Edited Volumes

[84] K.M. Anstreicher and R.A. Freund, editors, volume on "Interior Point Methods in Mathematical Programming," *Annals of Operations Research* 62 (1996).

[85] K.M. Anstreicher, editor, volume on "Interior Point Algorithms in Theory and Practice," *Mathematical Programming, Series B* 76 (1997).

[86] K.M. Anstreicher and A. Iusem, editors, volume on "Continuous Optimization - 5th Brazilian Workshop" (Festschrift in honor of Clovis Gonzaga), *Mathematical Programming, Series B* 111 (2008).

Unpublished Working Papers

[87] K.M. Anstreicher, "Generation of Feasible Descent Directions in Continuous Time Linear Programming," SOL Technical Report 83-18, Department of Operations Research, Stanford University, September 1983.

[88] K.M. Anstreicher, "Analysis of a Modified Karmarkar Algorithm for Linear Programming," School of Organization and Management Working Paper Series B #84, Yale University, August 1985.

[89] K.M. Anstreicher, "Analysis of Karmarkar's Algorithm for Fractional Linear Programming," November 1985, revised March 1986.

[90] K.M. Anstreicher, "On the Complexity of the Projective Algorithm for Standard Form Linear Programming," School of Organization and Management Working Paper Series B #104, Yale University, June 1987.

[91] K.M. Anstreicher, "Efficient Centering for Linear Programming Interior Point Methods," January 1992, revised December 1993.

[92] K.M. Anstreicher, J. Ji and Y. Ye, "Average Performance of an Ellipsoid Termination Criterion for Linear Programming Interior Point Algorithms," February 1992.

[93] K.M. Anstreicher and L. Wolsey, "On Dual Solutions in Subgradient Optimization," September 1992, revised September 1993.

[94] K.M. Anstreicher, "On the Equivalence of Convex Programming Bounds for Boolean Quadratic Programming," May 1998.

[95] K.M. Anstreicher, "A Pentomino Exclusion Problem," March 1999.

[96] K.M. Anstreicher, S. Burer and P.J.C. Dickinson, "An Algorithm for Computing the CP-Factorization of a Completely Positive Matrix," April 2012.

Citations

Google Scholar 4,150 citations, h = 36 (July 2023).

Outside Presentations

"Computing the Index and Drazin Inverse Using the Shuffle Algorithm"
SIAM Spring Meeting, Pittsburgh, June 1985.

"Analysis of a Modified Karmarkar Algorithm for Linear Programming"
12th International Symposium on Mathematical Programming, Boston, August 1985.

"Analysis of Karmarkar's Algorithm for Fractional Linear Programming"
Decision Sciences Seminar, The Wharton School, University of Pennsylvania, October 1985.
OR Center Seminar, M.I.T., November 1985.
IE/OR Seminar, Columbia University, December 1985.

"A Monotonic Projective Algorithm for Fractional Linear Programming"
IE/OR Seminar, Columbia University, October 1986.
ORSA/TIMS Joint National Meeting, Miami, October 1986.

"Linear Programming and the Newton Barrier Flow"
Symposium on Progress in Mathematical Programming, Monterey, March 1987.
Colloquium, University of Geneva, Switzerland, September 1987.

"A Standard Form Variant, And Safeguarded Linesearch, for the Modified Karmarkar Algorithm"
Colloquium, University of Geneva, Switzerland, September 1987.
Mathematics Seminar, IBM Watson Research Center, November 1987.
ORSA/TIMS Joint National Meeting, Washington D.C., April 1988.
EURO/TIMS Joint International Meeting, Paris, France, July 1988.

"A Combined Phase I – Phase II Projective Algorithm for Linear Programming"
OR/IE Seminar, Cornell University, October 1987.

"Dual Ellipsoids and Degeneracy in the Projective Algorithm for Linear Programming"
AMS Summer Research Conference, Bowdoin, June 1988.

"Recent Advances in Interior Point Algorithms for Linear Programming"
Computer Science Seminar, University of Toronto, February 1988.
OR Center Lunch, M.I.T., February 1989.
SIAM Conference on Optimization, Boston, April 1989.
15th Conference on Mathematics of Operations Research, Dalfsen, Netherlands, January 1990.
Invited Tutorial, ORSA-TIMS Joint National Meeting, Anaheim, November 1991.
Plenary talk, SOR96 meeting, Braunschweig, Germany, September 1996.

"Long Steps in an $O(n^3L)$ Algorithm for Linear Programming"
OR Seminar, RUTCOR, Rutgers University, December 1988.
Discrete Math Seminar, BELLCORE, Morristown, December 1988.
OR Seminar, Princeton University, January 1989.

"A Combined Phase I – Phase II Scaled Potential Algorithm for Linear Programming"
Intl. Symposium on Interior Point Methods, Scheveningen, Netherlands, January 1990.
Seminar, Facultés Universitaires Notre–Dame de la Paix, Namur, Belgium, March 1990.

"On the Performance of Karmarkar's Algorithm Over a Sequence of Iterations"
Workshop on Progress in Mathematical Programming, Monterey, February 1990.

"A Family of Search Directions for Karmarkar's Algorithm"
Seminar, Delft University of Technology, Delft, Netherlands, May 1990.
ORSA/TIMS Joint National Meeting, Philadelphia, October 1990.

"Strict Monotonicity and Improved Complexity in the Standard Form Projective Algorithm for LP"
Seminar, Delft University of Technology, Delft, Netherlands, May 1990.

"On Long Step Path Following and SUMT for Linear and Quadratic Programming"
ISyE Seminar, Georgia Institute of Technology, Atlanta, January 1991.
Management Science Seminar, University of Iowa, Iowa City, January 1991.
Applied Math Seminar, Cornell University, Ithaca, February 1991.
Management Science Seminar, University of Washington, Seattle, March 1991.
Discrete Math Seminar, BELLCORE, Morristown, March 1991.
INFORMS National Meeting, Washington DC, May 1996.

"More on Dual Ellipsoids and Degeneracy in Interior Algorithms for Linear Programming"
Fourth SIAM Conference on Optimization, Chicago, May 1992.

"On the Convergence of an Infeasible Primal–Dual Interior–Point Method for Convex Programming"
IE Seminar, Northwestern University, Evanston, October 1992.

"Average–Case Analysis of Interior Point Algorithms for Linear Programming"
Joint ORSA/TIMS National Meeting, Phoenix, November 1993.
15'th International Symposium on Mathematical Programming, Ann Arbor, August 1994.

"Large Step Volumetric Potential Reduction Algorithms for Linear Programming"
Joint CORS/Optimization Days Meeting, Montreal, June 1994.
15'th International Symposium on Mathematical Programming, Ann Arbor, August 1994.

"Interior Point Methods for Mathematical Programming"
Mini-course, 3me Cycle de Recherche Opèrationelle, Zinal, Switzerland, March 1997.

"On Vaidya's Volumetric Cutting Plane Method for Convex Programming"
Optimization '95 meeting, Braga, Portugal, July 1995.
Keynote talk, Berlin Algorithms Day, Konrad-Zuse-Zentrum (ZIB), Berlin, January 1997.
Seminar, Erasmus University, Rotterdam, Netherlands, April 1997.
Seminar, ETH, Zurich, Switzerland, June 1997.

"Linear Programming in $O([n^3/\ln n]L)$ Operations"
Seminar, Delft University of Technology, Delft, Netherlands, April 1997.
INFORMS National Meeting, Montreal, April 1998.

"Continuous Nonlinear Relaxations for Maximum-Entropy Sampling and Related Problems"
Workshop, Konrad-Zuse-Zentrum (ZIB), Berlin, November 1997.

"The Volumetric Barrier for Semidefinite Programming"
Workshop, Konrad-Zuse-Zentrum (ZIB), Berlin, November 1998.
AMS Regional meeting, Notre Dame University, April 2000.

"Eigenvalue Bounds versus Semidefinite Relaxations for the Quadratic Assignment Problem"
DIMACS Workshop, Princeton, January 1999.

"Solution of Quadratic Assignment Problems Using Continuous Quadratic Programming Relaxations"
INFORMS National Meeting, Philadelphia, November 1999.
Workshop, Mathematisches Forschungsinstitut, Oberwolfach, Germany, January 2000.
AMS Regional meeting, Notre Dame University, April 2000.
17th European Conference on Operational Research, Budapest, July 2000.
17th International Symposium on Mathematical Programmming, Atlanta, August 2000.

"Solving Large Quadratic Assignment Problems on Computational Grids"
IBM Watson Research Center, Yorktown Heights, October 2000.
SIAM Conference on Optimization, Toronto, Canada, May 2002. (SIAG/OPT Prize session)

"The Steinberg Wiring Problem,"
Workshop, Mathematisches Forschungsinstitut, Oberwolfach, Germany, January 2002.

"Improved Complexity for Maximum Volume Inscribed Ellipsoids"
SIAM Conference on Optimization, Toronto, Canada, May 2002.

"The Problem of the Thirteen Spheres"
Seminar, Operations Research Center, MIT, October 2002.
5th Brazilian Workshop on Continuous Optimization, Florianopolis, Brazil, March 2004.

"Recent Advances in the Solution of Quadratic Assignment Problems"
Plenary, 18th International Symposium on Mathematical Programmming, Copenhagen, August 2003.

"SDP versus RLT for Nonconvex QCQP"
Workshop on Integer Programming and Continuous Optimization, Chemnitz, Germany, November 2004.
GICOLAG Workshop, University of Vienna, Austria, December 2006.
Workshop on Advances in Global Optimization, Myconos, Greece, June 2007.
Seminar, Department of Decision Sciences, Duke University, December 2008.

"Musin's Proof of the Kissing Number in Dimension Four"
Workshop, Mathematisches Forschungsinstitut, Oberwolfach, Germany, January 2005.

"An Improved Algorithm for Computing Steiner Minimal Trees in $\Re^d$"
Workshop, Mathematisches Forschungsinstitut, Oberwolfach, Germany, November 2005.
Seminar, Dept. of Supply Chain and Information Systems, Pennsylvania State University, April 2006.
Seminar, IBM Watson Research Center, Yorktown Heights, April 2006.
Seminar, Dept. of Industrial Engineering, Lehigh University, April 2006.
19th International Symposium on Mathematical Programmming, Rio de Janeiro, Brazil, August 2006.
VICCOC Workshop, University of Vienna, Austria, December 2006.

"Computable Representations for Convex Hulls of Low-Dimensional Quadratic Forms"
Workshop on Discrete Optimization, Aussois, France, January 2008.
Seminar, Dept. of Industrial Engineering, University of Wisconsin, November 2008.

"The Difference between 5×5 Doubly Nonnegative and Completely Postiive Matrices"
SIAM Conference on Optimization, Boston, May 2008.
IMA Hot Topics Workshop, Minneapolis, November 2008.

"Strengthened Quadratic Programming Bounds for QAP"
INFORMS National Meeting, Washington DC, October 2008.

"Nonconvex Quadratic Programming: Return of the Boolean Quadric Polytope"
Integer Programming at CORE Workshop, Louvain-la-Neuve, Belgium, May 2009.
20th International Symposium on Mathematical Programming, Chicago, August 2009.
Seminar, Dept. of Systems Engineering, Chinese University of Hong Kong, October 2009.
Seminar, ISyE Department, Georgia Institute of Technology, Atlanta, December 2009.

"Comparing Convex Relaxations for Quadratically Constrained Quadratic Programming"
European Workshop on Mixed Integer Nonlinear Programming, CIRM, Marseille, France, April 2010.
INFORMS National Meeting, Austin, November 2010.

"Separating Doubly Nonnegative and Completely Positive Matrices"
INFORMS National Meeting, Austin, November 2010.

"Optimization with Copositive and Completely Positive Matrices"
Plenary, ICOTA8 Conference, Shanghai, China, December 2010.
Seminar, ISE Department, University of Illinois at Urbana-Champaign, February 2011.
37th Conference on Mathematics of Operations Research, Lunteren, Netherlands, January 2012.
Seminar, Dept. of Econometrics and Operations Research, Tilburg University, Netherlands, January 2012.
Plenary, MOPTA Conference, Lehigh University, July 2012.

"An Approach to the Dodecahedral Conjecture based on Bounds for Spherical Codes"
Workshop on Optimization, Fields Institute, Toronto, September 2011.
Plenary, 10th Brazilian Workshop on Continuous Optimization, Florianopolis, Brazil, March 2014.

"Nonconvex Quadratic Optimization over Simple Ground Sets"
37th Conference on Mathematics of Operations Research, Lunteren, Netherlands, January 2012.

"Second-Order-Cone Constraints for Extended Trust-Region Subproblems"
WID-DOW Seminar, University of Wisconsin, Madison, May 2012.
21st International Symposium on Mathematical Programming, Berlin, August 2012.
Seminar, Dept. of Industrial and Operations Engineering, University of Michigan, December 2012.

"Towards a Computable $O(n)$-Self-Concordant Barrier for Polyhedral Sets in $\Re^n$"
SIAM Conference on Optimization, San Diego, May 2014.

"An Algorithm to Compute the CP-Factorization of a Completely Positive Matrix"
22nd International Symposium on Mathematical Programming, Pittsburgh, July 2015.
Workshop, Mathematisches Forschungsinstitut, Oberwolfach, Germany, November 2017.

"Quadratic Optimization with Hollows"
Workshop, Mathematisches Forschungsinstitut, Oberwolfach, Germany, November 2015.

"Kronecker Product Constraints for Semidefinite Optimization"
BIRS-CMO Workshop, Oaxaca, Mexico, November 2015.

"Maximum Entropy Sampling and the Boolean Quadric Polytope"
Fourth Alpen-Adria Workshop on Optimization, Klagenfurt, Austria, November 2016.

"Convex Representations and Relaxations for Nonconvex Quadratic Optimization"
Lecture Series, Vienna Graduate School on Computational Optimization, Vienna, Austria, November 2016.

"Strengthened Semidefinite Relaxations for Quadratic Optimization with Switching Variables"
Workshop on Mixed Integer Nonlinear Programming, Schloss Dagstuhl, Germany, February 2018.
23rd International Symposium on Mathematical Programming, Bordeaux, France, July 2018.

"Efficient Solution of Maximum-Entropy Sampling Problems"
Workshop, Mathematisches Forschungsinstitut, Oberwolfach, Germany, June 2019.
Seminar, Vienna Center for Operations Research, University of Vienna, Austria, January 2020.

"Testing Copositivity via Mixed-Integer Linear Programming"
Optimization and OR Conference, US Naval Academy, virtual, June 2021.

"Semidefinite Optimization with Eigenvector Branching"
ICERM Workshop on Mixed-Integer Nonlinear Programming, Brown University, February 2023.

Collegiate and University Administration/Service

College of Business Promotion and Tenure Committee, 1992/93, 1993/94 (Chair), 2000/01, 2001/02.

College of Business MBA Committee, 1994/95, 1995/96, 1997/98, 1998/99, 1999/2000.

College of Business Elected Faculty Council, 1998/99, 1999/2000.

College of Business representative to University Faculty Senate, 1993/94 - 1995/96.

Office of the Vice President for Research Review Panel for Mathematical and Physical Sciences, 1994/95, 1995/96.

Obermann Center for Advanced Studies Advisory Committee, 1994/95, 1995/96 (Chair).

Graduate Council, 2000/01 - 2002/03, 2017/18

Graduate College Self-Study Committee, 2002/03.

Economics Department External Review Committee, 2003.

Department Executive Officer, 2003/04 - 2011/12.

Dean's Advisory Council, 2005/06, 2006/07, 2017/18, 2018/19.

Tippie College Dean Search Committee, 2005/06, 2011/12.

Applied Mathematics and Computational Science (AMCS) Advisory Committee, 2005/06, 2006/07.

Graduate College D.C. Spriestersbach Prize Committee, 2006.

Dual Career Network Advisory Committee, 2008/09 - 2011/12.

Provost's Task Force on Graduate and Professional Education, 2009.

Applied Mathematics and Computational Science (AMCS) Executive Committee, 2010/11, 2011/12.

University Academic Calendar Commitee, 2012/13.

Tippie College Senior Associate Dean, 2012/13 - 2016/17.

Learning Spaces Advisory Committee, 2012/13 -2014/15.

Graduate College Evaluation Committee for Social Sciences Doctoral Programs (Co-chair), 2015/16.

Academic Technology Advisory Committee 2017/18 - 2019/20.

University Committee on Open Educational Resources, 2017/18.

Executive MBA program committee, 2019.

Search committee for Tippie College Director of Finance, 2019.

Dept. of Business Analytics Research Committee (chair), 2020/21.

Tippie College Research Committee, 2020/21, 2021/22.

Search committee for Associate Dean for Undergraduate Programs (chair), 2021.

Tippie College self-study committee, 2021-2022.

Professional Service and Other Activities

Research Fellow, Center for Operations Research and Econometrics (CORE), Université Catholique de Louvain, Louvain-La-Neuve, Belgium, September 1989–June 1990.

Co–organizer (with M.H. Wright and N. Megiddo), Second Asilomar Workshop on "Progress in Mathematical Programming," Monterey, Febraury 1990.

Visiting Research Scholar, Department of Operations Research, George Washington University, July–August 1990.

Member, ORSA Lanchester Prize Committee, 1991.

Associate Editor, *SIAM Journal on Optimization*, 1991-1997.

Member, International Advisory Committee, 15th International Symposium on Mathematical Programming, Ann Arbor, August 1994.

Director, Faculty Research Seminar on "Optimization in Theory and Practice," Center for Advanced Studies, University of Iowa, Iowa City, August 1994.

Research Fellow, Center for Operations Research and Econometrics (CORE), Université Catholique de Louvain, Louvain-La-Neuve, Belgium, September 1996–June 1997.

Member, International Advisory Committee, 16th International Symposium on Mathematical Programming, Lausanne, August 1997.

Member, Tucker Prize Committee, 16th Intl. Symposium on Mathematical Programming, Lausanne, August 1997.

Member, Elected Council, Mathematical Programming Society, August 1997-2000.

Co-editor, *Mathematical Programming, Series A*, November 1999 – November 2005.

Chair, Tucker Prize Committee, 17th Intl. Symposium on Mathematical Programming, Atlanta, August 2000.

Co-organizer (with H. Wolkowicz, P. Pardalos, F. Rendl and T. Vannelli), Fields Institute Workshop on "Novel Approaches to Hard Discrete Optimization," Waterloo, April 2001.

Chair, SIAM Activity Group on Optimization (SIAG/OPT), 2004-07.

Co-organizer (with C. Helmberg and A. Martin), Workshop on "Integer Programming and Continuous Optimization," Chemnitz, Germany, November 2004.

Member, Organizing committee, SIAM Optimization Conference, Stockholm, May 2005.

Associate Editor, *Mathematical Programming, Series A*, December 2005 – July 2007.

Editor-in-Chief, *Mathematical Programming, Series A*, August 2007 – August 2012.

Co-Chair, Organizing committee, SIAM Optimization Conference, Boston, May 2008.

Member, INFORMS Von Neumann Prize Committee, 2008, 2009, 2010 (Chair).

Member, Nominating Committee, SIAM Activity Group on Optimization, 2010, 2019.

Executive Committee Chair, Mathematical Optimization Society, 2010-2013.

Member, Lagrange Prize Committee, Mathematical Optimization Society, 2012, 2015.

Chair, INFORMS Optimization Society Khachiyan Prize Committee, 2012.

Scientific Advisor, Programme on Polynomial Optimization, Isaac Newton Institute for Mathemtical Sciences, Cambridge University, July-August 2013.

Member, INFORMS Optimization Society Farkas Prize Committee, 2019, 2020 (Chair), 2023.

Visiting Professor, Vienna Center for Operations Research, University of Vienna, Austria, January–March 2020.

Visiting Researcher, Institute for Computational and Experimental Mathematics, Brown University, March–April 2023.

Awards and Honors

Interdisciplinary Research Grant (with F. Potra), Center for Advanced Studies, University of Iowa, June–July 1992.

"Faculty Member of the Year Award," MBA Program, College of Business, University of Iowa, April 1993.

"Outstanding Faculty" citation, *Business Week Guide to the Best Business Schools*, Fourth edition (1995); Fifth edition (1997); Seventh edition (2001), McGraw–Hill.

"Faculty Member of the Year Award," MBA Program, College of Business, University of Iowa, April 1996.

Daly Professor of Management Sciences, December 1998 - August 2002.

"Core Faculty Member of the Year Award," MBA Program, College of Business, University of Iowa, April 2000.

"G.R.E.A.T. Teaching Award," Executive MBA class of 2002, College of Business, University of Iowa, May 2002.

Tippie Research Professor of Management Sciences, August 2002 - June 2012.

"G.R.E.A.T. Teaching Award," Executive MBA class of 2003, College of Business, University of Iowa, May 2003.

"G.R.E.A.T. Teaching Award," Executive MBA class of 2004, College of Business, University of Iowa, May 2004.

SIAM Activity Group on Optimization (SIAG/OPT) Prize for best paper in optimization (with N. Brixius, J.-P. Goux, J. Linderoth), May 2002.

Fellow, CIC Academic Leadership Program, 2011/12.

Fellow, Institute for Operations Research and the Management Sciences (INFORMS), 2011.

Leonard A. Hadley Chair in Leadership, June 2012 - July 2014.

Gary C. Fethke Chair in Leadership, July 2014 - July 2023.

Outstanding First-Year Instructor Award, Des Moines Executive MBA class of 2015, May 2015.

Regents Award for Faculty Excellence, May 2020.

Refereeing

Algorithmica, Annals of Operations Research, Computational Optimization and Applications, Discrete Applied Mathematics, Discrete Optimization, European Journal of Operational Research, International Transactions in Operational Research, Journal of Global Optimization, Journal of Optimization Theory and Applications, Kuwait Journal of Science and Engineering, Linear Algebra and Its Applications, Management Science, Mathematical Programming, Mathematical Methods of Operations Research, Mathematics of Operations Research, National Science Foundation, *Operations Research, Operations Research Letters, ORSA/INFORMS Journal of Computing, Optimization Methods and Software, SIAM Journal on Optimization, SIAM Review.*

Memberships

Mathematical Optimization Society, New York Academy of Sciences, Institute for Operations Research and the Management Sciences, Society for Industrial and Applied Mathematics.