Computer Sciences Department and Wisconsin Institute for Discovery
University of Wisconsin, 1210 West Dayton Street, Madison, WI 53706
608-262-4281 (CS), 608-316-4356 (WID)
ferris@cs.wisc.edu, `http://www.cs.wisc.edu/~ferris`
Home address: 2102 Jefferson Street, Madison, WI 53711, 608-257-1428

## Academic Degrees

| | |
|---|---|
| B.A. | Mathematics, Churchill College, Cambridge 1984 |
| M.Phil. | Control Engineering & Operational Research, Churchill College, Cambridge, 1985<br>Thesis: "Linear Programming and Minimum Weight Design – A Comparison of Methods for Solving a Class of Structural Optimization Problems." |
| M.A. | Mathematics, Churchill College, Cambridge, 1988 |
| Ph.D. | Mathematical Programming, Churchill College, Cambridge, 1989<br>Thesis: "Weak Sharp Minima & Penalty Functions in Mathematical Programming." |

## Professional Experience

| | |
|---|---|
| 2019– | Jacques-Louis Lions Professor of Computer Sciences, University of Wisconsin |
| 2017– | Director, Data Sciences Hub, Wisconsin Institute for Discovery, Madison |
| 2016– | Stephen C. Kleene Professor in Computer Science, University of Wisconsin |
| 1988 – | Professor, Computer Sciences Dept., Univ. Wisconsin, Madison; Associate Prof (1994-98), Assistant Prof (1988-94); Professor (by courtesy), Ind. and Sys. Eng. (1988-present), Mathematics (2006-present) |
| 2019 | Simons Fellow, Isaac Newton Institute, University of Cambridge |
| 2018 | Visiting Professor, Judge Business School, University of Cambridge |
| 2017 – 2018 | Visiting Professor, Dept. Engineering Sci., University of Auckland, New Zealand |
| 2017 | Visiting Professor, Mathematical Institute, University of Oxford |
| 2009–2017 | Theme Leader (Optimization), Wisconsin Institute for Discovery, Madison |
| 06/03 | Professeur Invité, Mathematics Department, University of Limoges, Limoges |
| 2001-02 | Guggenheim Fellow, Visiting Fellow, Exeter College, Oxford,<br>and Visiting Professor, Oxford University Computing Laboratory |
| 1988–2001 | Member, Center for the Mathematical Sciences, University of Wisconsin |
| 08/96, 12/98 | Honorary Visiting Fellow, University of New South Wales, Sydney, Australia |
| 1994–1995 | Visiting Associate Professor, Department of Economics,<br>University of Colorado, Boulder |
| 07/89 | Visiting Professor, Consiglio Nazionale Delle Ricerche,<br>Istituto Di Analisi dei Sistemi ed Informatica, Rome |
| 1980–81 | Programmer, Programming Research Group,<br>Oxford University Computing Laboratory, Oxford |

## Professional Societies

Society for Industrial and Applied Mathematics, Institute for Operations Research and the Management Sciences, Mathematical Optimization Society

## Research Interests

Mathematical Optimization, Modeling and Applications of Operations Research, Complementarity Problems, Energy and Environmental Policy, Optimization in Medicine, Grid Computation, Numerical Algorithms.

## Grants and Patents

Principal Investigator on various research grants from NSF, DOE, AFOSR, NIH, USDA, Microsoft and GAMS Corp. U.S. Patent 6,868,452 "Method for caching of media files to reduce delivery cost", US Patent 8,615,068 "System and Method for Intensity Modulated Arc Therapy Treatment Planning".

## Professional Activities

| | |
|---|---|
| NEOS | Overall control and management (2010–present) |
| Co-Editor | Mathematical Programming (2001–2011) |
| Associate Ed. | ACM Transactions on Mathematical Software (2004–18), INFORMS Journal on Computing (2019–present), Journal of Economic Dynamics and Control (2000–08), Mathematical Programming (1997–2001, 2012–present), Optimization Methods and Software (1992–present), SIAM Journal on Control and Opt. (1992-97), SIAM Journal on Optimization (2002–2015) |
| Ed. Board | MPS/SIAM Series on Optimization (2003–07) |
| Officer | SIAM Activity Group on Optimization, 2008–10 (Chair)<br>Optimization Section of Institute for Operations Research and Management Sciences, 1997-98 (Vice-Chair), 1998-99 (Chair) |
| Exec. Comm. | Physical Sciences Division, University of Wisconsin (2005–08) |
| Member | Beale-Orchard-Hays Prize Comm. (2000, Chair 2012, 2015), Broyden Prize Comm. (Chair 2012-2015), INFORMS Nicholson Prize Comm. (2008, Chair 2009), ICCOPT Steering Comm., Mathematical Programming Society (2008-09), INFORMS Dantzig Thesis Award Comm. (2006-07), INFORMS Optimization Prize (2002), Lanchester Prize Comm. (1998-99,2015-16), INFORMS Optimization Young Researcher Award (Chair 2017) |
| Referee | National Science Foundation; Department of Energy; Australian, British, Canadian, Dutch, Israeli, Norwegian and Swedish Research Councils and various prof. journals. |

## Conference and Session Organizer

Program Comm. Member: ISMP (2018, 2009), ICCOPT II, SIAM Opt. Conf. (2011 (Chair), 2008, 1999)
Co-organizer of International Conf. on Complementarity Problems (2014, '12, '05, '02, 1999, '95)
Organizer: IPAM workshop (2016): Optimization and equilibrium in energy economics
Cluster chair at ORSA/TIMS and INFORMS meetings; organizer and co-organizer of major workshops and many technical sessions; session chair at numerous local and international meetings

## Advisors and Advisees

Total number of Postdoctoral advisees: 8. N. Bartelt, B. Shapiro, H. Dong, J. Ramakhrisnan, S. Wangen, C. Michini, A. Christensen, O. Huber
Total number of Ph.D. students advised: 13. (M. Cao (Industry), S. Dirkse (Industry), S. Billups (University of Colorado), T. Munson (Argonne Natn. Lab.), Q. Chen (Industry), K. Sinapiromsaran (Chulalongkorn University, Thailand), M. Voelker (APL, Johns Hopkins), J.–H. Lim (University of Houston), G. Deng (Industry), Q. Li (Industry), J. Holzer (Pacific Northwest Natn. Lab.), Y. Liu (Wayne State Univ.), Y. Kim (Argonne Natn. Lab.)
Ph.D. and Master's advisors: E. Anderson, A. Philpott

## Honours and Prizes

| | |
|---|---|
| 2013 | Fellow of SIAM |
| 2012 | Power and Energy Society: Power System Anal., Comput. and Econ. Prize |
| 2006 | Fellow of INFORMS |
| 2006 | Carolyn Rosner Excellent Educator Award, Comp. Sci. Dept., Univ. Wisconsin |
| 2004 | Sonoco Technology Award, Sonoco Products Company |
| 2002 | The William Pierskalla best paper award for research excellence in health care management science, Institute for Operations Research and the Management Sciences |
| 2001-02 | Guggenheim Fellowship |
| 1999-01 | Vilas Associate Award, University of Wisconsin |
| 1997 | Beale-Orchard-Hays Prize for Excellence in Computational Mathematical Programming, Mathematical Programming Society |
| 1994 | National Comput. Science Award for Teaching Undergraduates, Dept. of Energy |
| 1991 | Presidential Young Investigators Award, National Science Foundation |
| 1986–87 | University of Wisconsin–Madison Chancellor's Award |
| 1986 | Rayleigh Prize for Mathematics, Cambridge University |
| 1985 | Arthur Shercliff Memorial Prize, Cambridge University |
| 1984–88 | Science and Engineering Research Council Award, United Kingdom |
| 1984–85 | Churchill College Honorary Scholar, Cambridge University |
| 1984 | Wrangler, Mathematics, Cambridge University |

## Recent Colloquia

Numerous invited talks at U.S. and foreign universities and professional meetings. Details available at `http://www.cs.wisc.edu/~ferris/ferris.talks`

## Publications

[1] M. C. Ferris, *Linear Programming and Minimum Weight Design – A Comparison of Methods for Solving a Class of Structural Optimization Problems*. PhD thesis, University of Cambridge, Cambridge, 1985.

[2] M. C. Ferris, *Weak Sharp Minima and Penalty Functions in Mathematical Programming*. PhD thesis, University of Cambridge, Cambridge, 1988.

[3] M. C. Ferris and A. B. Philpott, "On the Performance of Karmarkar's Algorithm," *Journal of the Operational Research Society*, vol. 39, pp. 257–270, Mar. 1988.

[4] M. C. Ferris and A. B. Philpott, "An Interior Point Algorithm for Semi–Infinite Linear Programming," *Mathematical Programming*, vol. 43, pp. 257–276, 1989.

[5] M. C. Ferris, "Weak Sharp Minima and Penalty Functions in Mathematical Programming," Tech. Rep. 779, Computer Sciences Department, University of Wisconsin, Madison, Wisconsin, 1988.

[6] M. C. Ferris, "Finite Termination of the Proximal Point Algorithm," *Mathematical Programming*, vol. 50, pp. 359–366, 1991.

[7] M. C. Ferris, "Iterative Linear Programming Solution of Convex Programs," *Journal of Optimization Theory and Applications*, vol. 65, pp. 53–65, 1990.

[8] M. C. Ferris and O. L. Mangasarian, "Finite Perturbation of Convex Programs," *Applied Mathematics and Optimization*, vol. 23, pp. 263–273, 1991.

[9] M. C. Ferris, "Parallel Solution of Extremely Large Knapsack Problems," Tech. Rep. 842, Computer Sciences Department, University of Wisconsin, Madison, Wisconsin, 1989.

[10] J. V. Burke and M. C. Ferris, "Characterization of Solution Sets of Convex Programs," *Operations Research Letters*, vol. 10, pp. 57–60, 1991.

[11] M. C. Ferris and O. L. Mangasarian, "Minimum Principle Sufficiency," *Mathematical Programming*, vol. 57, pp. 1–14, 1992.

[12] E. J. Anderson and M. C. Ferris, "Parallel Genetic Algorithms in Optimization," in *Proceedings of the Fourth SIAM conference on Parallel Processing for Scientific Computing, Chicago, Illinois, December 11-13*, 1989.

[13] M. C. Ferris and M. Vlach, "Scheduling with Earliness and Tardiness Penalties," *Naval Research Logistics Quarterly*, vol. 39, no. 2, pp. 229–245, 1992.

[14] E. J. Anderson and M. C. Ferris, "A Genetic Algorithm for the Assembly Line Balancing Problem," in *Proceedings of the Integer Programming / Combinatorial Optimization Conference, Waterloo, Ontario, Canada, May 28–30*, University of Waterloo Press, 1990.

[15] M. C. Ferris and A. B. Philpott, "On affine scaling and semi-infinite programming," *Mathematical Programming*, vol. 56, pp. 361–364, 1992.

[16] J. V. Burke, M. C. Ferris, and M. Qian, "On the Clarke Subdifferential of the Distance Function to a Closed Set," *Journal of Mathematical Analysis and its Applications*, vol. 166, pp. 199–213, 1992.

[17] M. Cao and M. C. Ferris, "Genetic Algorithms in Optimization," *Journal of Undergraduate Mathematics and its Applications*, vol. 12, pp. 81–90, 1991.

[18] M. C. Ferris and O. L. Mangasarian, "Parallel constraint distribution," *SIAM Journal on Optimization*, vol. 1, pp. 487–500, Nov. 1991.

[19] K. Bennett, M. C. Ferris, and Y. E. Ioannidis, "A Genetic Algorithm for Database Query Optimization," in *Proceedings of the Fourth International Conference on Genetic Algorithms* (R. K. Belew and L. B. Booker, eds.), (San Mateo, California), pp. 400–407, Morgan Kaufmann Publishers, Inc, 1991.

[20] M. C. Ferris, "Parallel Constraint Distribution in Convex Quadratic Programming," *Mathematics of Operations Research*, vol. 19, pp. 645–658, Aug. 1994.

[21] M. C. Ferris and S. Lucidi, "Globally Convergent Methods for Nonlinear Equations," Tech. Rep. 1030, Computer Sciences Department, University of Wisconsin, Madison, Wisconsin, 1991.

[22] E. J. Anderson and M. C. Ferris, "Genetic Algorithms for Combinatorial Optimization: The Assembly Line Balancing Problem," *ORSA Journal on Computing*, vol. 6, pp. 161–173, 1994.

[23] J. Burke and M. Ferris, "Weak Sharp Minima in Mathematical Programming," *SIAM Journal on Control and Optimization*, vol. 31, no. 5, pp. 1340–1359, 1993.

[24] M. C. Ferris and O. L. Mangasarian, "Error Bounds and Strong Upper Semicontinuity for Monotone Affine Variational Inequalities," *Annals of Operations Research*, vol. 47, pp. 293–305, 1993.

[25] S. P. Dirkse, M. C. Ferris, P. V. Preckel, and T. F. Rutherford, "The GAMS Callable Program Library for Variational and Complementarity Solvers," Mathematical Programming Technical Report 94-07, Computer Sciences Department, University of Wisconsin, Madison, Wisconsin, 1994.

[26] J. Eckstein and M. C. Ferris, "Operator Splitting Methods for Monotone Linear Complementarity Problems," TMC#23 239, Thinking Machines Corporation, Cambridge, Massachusetts, 1992.

[27] M. C. Ferris, "The Linear Complementarity Problem," *Bulletin of the American Mathematical Society*, vol. 28, pp. 169–175, 1993.

[28] M. Cao and M. C. Ferris, "Interior-Point Algorithms for Monotone Affine Variational Inequalities," *Journal of Optimization Theory and Applications*, vol. 83, no. 2, pp. 269–283, 1994.

[29] M. Cao and M. C. Ferris, "A Pivotal Method for Affine Variational Inequalities," *Mathematics of Operations Research*, vol. 21, pp. 44–64, 1996.

[30] M. C. Ferris and S. Lucidi, "Nonmonotone Stabilization Methods for Nonlinear Equations," *Journal of Optimization Theory and Applications*, vol. 81, pp. 53–71, Apr. 1994.

[31] M. C. Ferris and O. L. Mangasarian, "Parallel variable distribution," *SIAM Journal on Optimization*, vol. 4, pp. 815–832, Nov. 1994.

[32] J. V. Burke and M. C. Ferris, "A Gauss–Newton Method for Convex Composite Optimization," *Mathematical Programming*, vol. 71, pp. 179–194, 1995.

[33] S. P. Dirkse and M. C. Ferris, "The PATH Solver: A Non-Monotone Stabilization Scheme for Mixed Complementarity Problems," *Optimization Methods and Software*, vol. 5, pp. 123–156, Jan. 1995.

[34] S. C. Billups and M. C. Ferris, "Convergence of an infeasible interior-point algorithm from arbitrary positive starting points," *SIAM Journal on Optimization*, vol. 6, pp. 316–325, May 1996.

[35] M. C. Ferris and J. S. Pang, "Nondegenerate solutions and related concepts in affine variational inequalities," *SIAM Journal on Control and Optimization*, vol. 34, pp. 244–263, Jan. 1996.

[36] S. P. Dirkse and M. C. Ferris, "MCPLIB: A Collection of Nonlinear Mixed Complementarity Problems," *Optimization Methods and Software*, vol. 5, pp. 319–345, Jan. 1995.

[37] M. Cao and M. C. Ferris, "P_C Matrices and the Linear Complementarity Problem," *Linear Algebra and Its Applications*, vol. 246, pp. 299–312, 1996.

[38] M. Cao and M. C. Ferris, "Lineality Removal for Copositive–Plus Normal Maps," *Communications on Applied Nonlinear Analysis*, vol. 2, pp. 1–10, 1995.

[39] S. P. Dirkse and M. C. Ferris, "A Pathsearch Damped Newton Method for Computing General Equilibria," *Annals of Operations Research*, vol. 68, pp. 211–232, 1996.

[40] M. C. Ferris and J. D. Horn, "Partitioning Mathematical Programs for Parallel Solution," *Mathematical Programming*, vol. 80, pp. 35–62, 1998.

[41] M. C. Ferris and D. Ralph, "Projected Gradient Methods for Nonlinear Complementarity Problems via Normal Maps," in *Recent Advances in Nonsmooth Optimization* (D. Du, L. Qi, and R. Womersley, eds.), pp. 57–87, World Scientific Publishers, 1995.

[42] S. C. Billups and M. C. Ferris, "Solutions to Affine Generalized Equations Using Proximal Mappings," *Mathematics of Operations Research*, vol. 24, no. February, pp. 219–236, 1999.

[43] M. C. Ferris, S. Lucidi, and M. Roma, "Nonmonotone Curvilinear Stabilization Techniques for Unconstrained Optimization," *Computational Optimization and Applications*, vol. 6, pp. 117–136, 1996.

[44] J. Eckstein and M. C. Ferris, "Operator Splitting Methods for Monotone Affine Variational Inequalities, with a Parallel Application to Optimal Control," *INFORMS Journal on Computing*, vol. 10, pp. 218–235, 1998.

[45] M. C. Ferris, A. Meeraus, and T. F. Rutherford, "Computing Wardropian Equilibrium in a Complementarity Framework," *Optimization Methods and Software*, vol. 10, pp. 669–685, Jan. 1999.

[46] M. C. Ferris and J. S. Pang, "Engineering and Economic Applications of Complementarity Problems," *SIAM Review*, vol. 39, pp. 669–713, 1997.

[47] S. C. Billups and M. C. Ferris, "QPCOMP: A Quadratic Program Based Solver for Mixed Complementarity Problems," *Mathematical Programming*, vol. 76, pp. 533–562, Mar. 1997.

[48] M. C. Ferris and T. F. Rutherford, "Accessing Realistic Complementarity Problems within Matlab," in *Nonlinear Optimization and Applications* (G. D. Pillo and F. Giannessi, eds.), pp. 141–153, New York: Plenum Press, 1996.

[49] C. Böehringer, M. C. Ferris, and T. F. Rutherford, "Alternative CO2 Abatement Strategies for the European Union," in *Climate Change, Transport and Environmental Policy*, (Cheltenham, England), pp. 16–47, Edward Elgar, 1998.

[50] M. C. Ferris and O. L. Mangasarian, "Breast Cancer Diagnosis via Linear Programming," *IEEE Computational Science and Engineering*, vol. 2, pp. 70–71, 1995.

[51] S. C. Billups, S. P. Dirkse, and M. C. Ferris, "A Comparison of Large Scale Mixed Complementarity Problem Solvers," *Computational Optimization and Applications*, vol. 7, no. 1, pp. 3–25, 1997.

[52] S. P. Dirkse and M. C. Ferris, "Crash Techniques for Large-Scale Complementarity Problems," in *Complementarity and Variational Problems: State of the Art* (M. C. Ferris and J. S. Pang, eds.), (Philadelphia, Pennsylvania), pp. 40–61, SIAM Publications, 1997.

[53] F. Tin-Loi and M. C. Ferris, "Holonomic Analysis of Quasibrittle Fracture with Nonlinear Softening," in *Advances in Fracture Research* (B. L. Karihaloo, Y. W. Mai, M. I. Ripley, and R. O. Ritchie, eds.), vol. 2, (Oxford), pp. 2183–2190, Pergamon Press, 1997.

[54] M. C. Ferris, M. P. Mesnier, and J. J. Moré, "NEOS and Condor: Solving Nonlinear Optimization Problems over the Internet," *ACM Transactions on Mathematical Software*, vol. 26, pp. 1–18, 2000.

[55] E. J. Anderson and M. C. Ferris, "A Direct Search Algorithm for Optimization with Noisy Function Evaluations," *SIAM Journal on Optimization*, vol. 11, pp. 837–857, 2001.

[56] M. C. Ferris and S. K. Zavriev, "The Linear Convergence of a Successive Linear Programming Algorithm," Mathematical Programming Technical Report 96–12, Computer Sciences Department, University of Wisconsin, Madison, Wisconsin, 1996.

[57] M. C. Ferris and J. S. Pang, eds., *Complementarity and Variational Problems: State of the Art*, (Philadelphia, Pennsylvania), SIAM Publications, 1997.

[58] J. Eckstein and M. C. Ferris, "Smooth Methods of Multipliers for Complementarity Problems," *Mathematical Programming*, vol. 86, pp. 65–90, 1999.

[59] F. Tin-Loi and M. C. Ferris, "A Simple Mathematical Programming Method for a Structural Identification Problem," in *Seventh International Conference on Computing in Civil and Building Engineering (ICCCBE-VII), Seoul, Korea, 19-21 August*, (Korea), pp. 511–518, Techno-Press, 1997.

[60] M. C. Ferris and A. Ruszczyński, "Robust Path Choice in Networks with Failures," *Networks*, vol. 35, pp. 181–194, 2000.

[61] S. P. Dirkse and M. C. Ferris, "Traffic Modeling and Variational Inequalities using GAMS," in *Operations Research and Decision Aid Methodologies in Traffic and Transportation Management* (P. L. Toint, M. Labbe, K. Tanczos, and G. Laporte, eds.), vol. 166 of *NATO ASI Series F*, pp. 136–163, Springer-Verlag, 1998.

[62] S. P. Dirkse and M. C. Ferris, "Modeling and Solution Environments for MPEC: GAMS & MATLAB," in *Reformulation: Nonsmooth, Piecewise Smooth, Semismooth and Smoothing Methods* (M. Fukushima and L. Qi, eds.), pp. 127–148, Kluwer Academic Publishers, 1999.

[63] M. C. Ferris and T. S. Munson, "Interfaces to PATH 3.0: Design, Implementation and Usage," *Computational Optimization and Applications*, vol. 12, pp. 207–227, 1999.

[64] M. C. Ferris and F. Tin-Loi, "Nonlinear Programming Approach for a Class of Inverse Problems in Elastoplasticity," *Structural Engineering and Mechanics*, vol. 6, pp. 857–870, 1998.

[65] M. C. Ferris, R. Fourer, and D. M. Gay, "Expressing Complementarity Problems and Communicating them to Solvers," *SIAM Journal on Optimization*, vol. 9, no. 4, pp. 991–1009, 1999.

[66] M. Ferris and F. Tin-Loi, "On the Solution of a Minimum Weight Elastoplastic Problem involving Displacement and Complementarity Constraints," *Computer Methods in Applied Mechanics and Engineering*, vol. 174, pp. 107–120, May 1999.

[67] M. C. Ferris, C. Kanzow, and T. S. Munson, "Feasible Descent Algorithms for Mixed Complementarity Problems," *Mathematical Programming*, vol. 86, pp. 475–497, 1999.

[68] D. M. Shepard, M. C. Ferris, G. Olivera, and T. R. Mackie, "Optimizing the Delivery of Radiation to Cancer Patients," *SIAM Review*, vol. 41, pp. 721–744, 1999.

[69] D. L. Eager, M. C. Ferris, and M. K. Vernon, "Optimized Regional Caching for On-Demand Data Delivery," in *Multimedia Computing and Networking, Proceedings of SPIE*, vol. 3654, (Bellingham, Washington), pp. 301–316, 1999.

[70] M. C. Ferris and T. S. Munson, "Complementarity Problems in GAMS and the PATH Solver," *Journal of Economic Dynamics and Control*, vol. 24, pp. 165–188, 2000.

[71] M. C. Ferris and T. S. Munson, "Modeling Languages and Condor: Metacomputing for Optimization," *Mathematical Programming*, vol. 88, pp. 487–505, 2000.

[72] D. L. Eager, M. C. Ferris, and M. K. Vernon, "Optimized Caching in Systems with Heterogeneous Client Populations," *Performance Evaluation*, vol. 42, pp. 163–185, 2000.

[73] M. C. Ferris and T. S. Munson, "Case Studies in Complementarity: Improving Model Formulation," in *Ill–Posed Variational Problems and Regularization Techniques* (M. Théra and R. Tichatschke, eds.), no. 477 in Lecture Notes in Economics and Mathematical Systems, pp. 79–98, Berlin, Germany: Springer Verlag, 1999.

[74] M. C. Ferris and C. Kanzow, "Complementarity and Related Problems: A Survey," in *Handbook of Applied Optimization* (P. M. Pardalos and M. G. C. Resende, eds.), pp. 514–530, New York, New York: Oxford University Press, 2002.

[75] M. C. Ferris, "MATLAB and GAMS: Interfacing Optimization and Visualization Software," Mathematical Programming Technical Report 98-19, Computer Sciences Department, University of Wisconsin, Madison, Wisconsin, 1998.

[76] M. C. Ferris and T. S. Munson, "Linear Programming for Emergency Broadcast Systems," *SIAG/OPT Newsletter*, vol. 10, pp. 6–8, 1999.

[77] M. C. Ferris and K. Sinapiromsaran, "Formulating and Solving Nonlinear Programs as Mixed Complementarity Problems," in *Optimization* (V. H. Nguyen, J. J. Strodiot, and P. Tossings, eds.), vol. 481 of *Lecture Notes in Economics and Mathematical Systems*, Springer-Verlag, 2000.

[78] M. C. Ferris and F. Tin-Loi, "Limit Analysis of Frictional Block Assemblies as a Mathematical Program with Complementarity Constraints," *International Journal of Mechanical Sciences*, vol. 43, pp. 209–224, 2001.

[79] F. Tin-Loi and M. C. Ferris, "Complementarity Problems in Engineering and Mechanics: Models and Solution," in *Computational Mechanics for the Next Millenium* (C. M. Wang, K. H. Lee, and K. K. Ang, eds.), vol. 2 of *Proceedings of APCOM '99, Fourth Asia-Pacific Conference on Computational Mechanics*, pp. 1029–1036, Elsevier Science Ltd, 1999.

[80] M. C. Ferris and R. R. Meyer, "Models and Solution for On-Demand Data Delivery Problems," in *Approximation and Complexity in Numerical Optimization: Continuous and Discrete Problems* (P. M. Pardalos, ed.), vol. 42 of *Nonconvex Optimization and its Applications*, pp. 175–188, Dordrecht: Kluwer Academic Publishers, 2000.

[81] Q. Chen and M. C. Ferris, "FATCOP: A Fault Tolerant Condor-PVM Mixed Integer Program Solver," *SIAM Journal on Optimization*, vol. 11, pp. 1019–1036, Jan. 2001.

[82] J.-C. De Bremaecker, M. Ferris, and D. Ralph, "Compressional fractures considered as contact problems and mixed complementarity problems," *Engineering Fracture Mechanics*, vol. 66, pp. 287–303, 2000.

[83] T. S. Munson, F. Facchinei, M. C. Ferris, A. Fischer, and C. Kanzow, "The Semismooth Algorithm for Large Scale Complementarity Problems," *INFORMS Journal on Computing*, vol. 13, pp. 294–311, 2001.

[84] D. L. Eager, M. C. Ferris, and M. K. Vernon, "Models for Optimized Regional Caching in Heterogeneous Video-On-Demand Systems," Technical Report 1402, Computer Sciences Department, University of Wisconsin, Madison, Wisconsin, 1999.

[85] W. D. D'Souza, R. R. Meyer, M. C. Ferris, and B. R. Thomadsen, "Mixed Integer Programming Models for Prostate Brachytherapy Treatment Optimization," *Medical Physics*, vol. 26, no. 6, p. 1099, 1999.

[86] M. C. Ferris and T. S. Munson, "Preprocessing Complementarity Problems," in *Complementarity: Applications, Algorithms and Extensions* (M. C. Ferris, O. L. Mangasarian, and J. S. Pang, eds.), vol. 50 of *Applied Optimization*, (Dordrecht, The Netherlands), pp. 143–164, Kluwer Academic Publishers, 2001.

[87] R. R. Meyer, W. D. D'Souza, M. C. Ferris, and B. R. Thomadsen, "MIP Models and BB Strategies in Brachytherapy Treatment Optimization," *Journal of Global Optimization*, vol. 25, no. 1, pp. 23–42, 2003.

[88] M. C. Ferris, T. S. Munson, and D. Ralph, "A Homotopy Method for Mixed Complementarity Problems based on the PATH Solver," in *Numerical Analysis 1999* (D. F. Griffiths and G. A. Watson, eds.), Research Notes in Mathematics, (London), pp. 143–167, Chapman and Hall, 2000.

[89] Q. Chen, M. C. Ferris, and J. T. Linderoth, "FATCOP 2.0: Advanced Features in an Opportunistic Mixed Integer Programming Solver," *Annals of Operations Research*, vol. 103, pp. 17–32, 2001.

[90] J. C. De Bremaecker and M. C. Ferris, "A Comparison of Two Algorithms for Solving Closed Crack Problems," *Engineering Fracture Mechanics*, vol. 66, pp. 601–605, 2000.

[91] M. C. Ferris and D. M. Shepard, "Optimization of Gamma Knife Radiosurgery," in *Discrete Mathematical Problems with Medical Applications* (D.-Z. Du, P. Pardalos, and J. Wang, eds.), vol. 55 of *DIMACS Series in Discrete Mathematics and Theoretical Computer Science*, pp. 27–44, American Mathematical Society, 2000.

[92] M. C. Ferris, T. S. Munson, and K. Sinapiromsaran, "A Practical Approach to Sample-Path Simulation Optimization," in *Proceedings of the 2000 Winter Simulation Conference* (J. A. Joines, R. R. Barton, K. Kang, and P. A. Fishwick, eds.), (Orlando, Florida), pp. 795–804, Omnipress, 2000.

[93] D. M. Shepard, M. C. Ferris, R. Ove, and L. Ma, "Inverse Treatment Planning for Gamma Knife Radiosurgery," *Medical Physics*, vol. 27, pp. 2748–2756, 2000.

[94] M. C. Ferris and T. S. Munson, "Interior Point Methods for Massive Support Vector Machines," *SIAM Journal on Optimization*, vol. 13, pp. 783–804, 2003.

[95] M. C. Ferris, O. L. Mangasarian, and J. S. Pang, eds., *Complementarity: Applications, Algorithms and Extensions*, vol. 50 of *Applied Optimization*, (Dordrecht, The Netherlands), Kluwer Academic Publishers, 2001.

[96] W. D. D'Souza, R. R. Meyer, B. R. Thomadsen, and M. C. Ferris, "An Iterative Sequential Mixed-Integer Approach to Automated Prostate Brachytherapy Treatment Optimization," *Physics in Medicine and Biology*, vol. 46, pp. 297–322, 2001.

[97] M. C. Ferris and T. S. Munson, "Semismooth Support Vector Machines," *Mathematical Programming B*, vol. 101, pp. 185–204, 2004.

[98] M. C. Ferris and M. M. Voelker, "Slice Models in General Purpose Modeling Systems: An Application to DEA," *Optimization Methods and Software*, vol. 17, pp. 1009–1032, Jan. 2002.

[99] M. C. Ferris, J. H. Lim, and D. M. Shepard, "Radiosurgery Treatment Planning via Nonlinear Programming," *Annals of Operations Research*, vol. 119, no. 1/4, pp. 247–260, 2003.

[100] K. Sinapiromsaran and M. C. Ferris, "Simulation Optimization Based on a Heterogeneous Computing Environment," in *Proceedings of the International Conference on Information Technology for the New Milennium (IConIT2001)*, pp. 238–248, 2001.

[101] M. C. Ferris and S. M. Robinson, "Enhanced Technology for Hard Optimization Problems," in *Proceedings of the Third International Conference on Intelligent Processing and Manufacturing of Materials (IPMM-2001)*, (Vancouver, British Columbia), p. J. A. Meech and S. M. Veiga and M. M. Veiga and S., 2001.

[102] M. C. Ferris, G. Pataki, and S. Schmieta, "Solving the Seymour Problem," *Optima*, vol. 66, pp. 1–7, 2001.

[103] M. C. Ferris and M. M. Voelker, "Slice Models in GAMS," in *Operations Research Proceedings 2001* (P. Chamoni, R. Leisten, A. Martin, J. Minnemann, and H. Stadtler, eds.), pp. 239–246, Springer-Verlag, 2002.

[104] J. C. De Bremaecker and M. C. Ferris, "Numerical Models of Shear Fracture Propogation," *International Journal of Fracture*, vol. 21, pp. 2161–2178, 2004.

[105] H. Zhang, G. Wahba, Y. Lin, M. M. Voelker, M. C. Ferris, R. Klein, and B. Klein, "Variable Selection via Basis Pursuit for Non-Gaussian Data," in *2001 Proceedings of the American Statistical Association, Biometrics Section [CDROM]*, (Alexandria, VA), American Statistical Association, 2001.

[106] M. Ferris, J. Lim, and D. Shepard, "An optimization approach for radiosurgery treatment planning," *SIAM Journal on Optimization*, vol. 13, no. 3, pp. 921–937, 2003.

[107] J. M. Almeida, D. L. Eager, M. C. Ferris, and M. K. Vernon, "Provisioning Content Distribution Networks for Streaming Media," in *Proceeedings of 21st Annual Joint Conference of IEEE Computer and Communications Societies (Infocom 2002)*, (New York), pp. 1746–1756, 2002.

[108] M. C. Ferris and M. M. Voelker, "Fractionation in Radiation Treatment Planning," *Mathematical Programming B*, vol. 102, pp. 387–413, 2004.

[109] M. C. Ferris, S. P. Dirkse, and A. Meeraus, "Mathematical Programs with Equilibrium Constraints: Automatic Reformulation and Solution via Constrained Optimization," in *Frontiers in Applied General Equilibrium Modeling* (T. J. Kehoe, T. N. Srinivasan, and J. Whalley, eds.), pp. 67–93, Cambridge University Press, 2005.

[110] H. Zhang, G. Wahba, Y. Lin, M. M. Voelker, M. C. Ferris, R. Klein, and B. Klein, "Variable Selection and Model Building via Likelihood Basis Pursuit," *Journal of American Statistical Association*, vol. 99, no. 467, pp. 659–672, 2004.

[111] M. C. Ferris and M. M. Voelker, "Neuro-Dynamic Programming for Radiation Treatment Planning," tech. rep., Oxford University Computing Laboratory, 2002.

[112] D. M. Shepard, L. S. Chin, S. J. DiBiase, S. A. Naqvi, J. Lim, and M. C. Ferris, "Clinical implementation of an automated planning system for gamma knife radiosurgery," *International Journal of Radiation Oncology Biology Physics*, vol. 56, no. 5, pp. 1488–1494, 2003.

[113] M. C. Ferris, R. R. Meyer, and W. D'Souza, "Radiation Treatment Planning: Mixed Integer Programming Formulations and Approaches," in *Handbook on Modelling for Discrete Optimization* (G. Appa, L. Pitsoulis, and H. P. Williams, eds.), vol. 21201, pp. 317–340, New York, NY: Springer Science + Business Media, 2006.

[114] J. H. Lim, M. C. Ferris, S. J. Wright, D. M. Shepard, and M. A. Earl, "An Optimization Framework for Conformal Radiation Treatment Planning," *INFORMS Journal on Computing*, vol. 19, pp. 366–380, 2007.

[115] M. C. Ferris, J. H. Lim, and D. M. Shepard, "Optimization Tools for Radiation Treatment Planning in Matlab," in *Operations Research and Health Care: A Handbook of Methods and Applications* (M. L. Brandeau, F. Sainfort, and W. P. Pierskalla, eds.), pp. 775–806, Boston: Kluwer Academic Publishers, 2004.

[116] D. M. Shepard, Z. Jiang, M. A. Earl, M. C. Ferris, J. Lim, and S. Naqvi, "A toolbox for intensity modulated radiation therapy optimization.," *Medical Physics*, vol. 30, pp. 2320–2322, 2003.

[117] J. C. De Bremaecker, M. C. Ferris, and A. M. Linkov, "Including Gravity in the Displacement Discontinuity Method when Accounting for Contact Interaction," *International Journal of Rock Mechanics and Mining Sciences*, vol. 41, pp. 1043–1044, 2004.

[118] M. C. Ferris, K. Judd, and B. Rustem, "Special Issue on Mathematical Programming, Foreword and Issue Editors," *Journal of Economic Dynamics and Control*, vol. 28(7), 2004.

[119] M. C. Ferris, M. M. Voelker, and H. Zhang, "Model Building with Likelihood Basis Pursuit," *Optimization Methods and Software*, vol. 19, pp. 577–594, 2004.

[120] M. Ferris and M. Solodov, "Foreword: special issue for the 70th birthday of Professor Olvi Mangasarian," *Optimization Methods and Software*, vol. 19(5), pp. 439–441, Oct. 2004.

[121] M. C. Ferris and Y. Zhang, "Foreword: special issue on mathematical programming in biology and medicine," *Mathematical Programming*, vol. 101, pp. 297–299, 2004.

[122] M. C. Ferris, J. S. Pang, D. Ralph, and S. Scholtes, "Complementarity Problems: 40 years on, Foreword and Issue Editors," *Mathematical Programming*, vol. 101, July 2004.

[123] X. Ban, H. X. Liu, J. Lu, and M. C. Ferris, "A decomposition scheme for continuous network design problem with asymmetric user equilibrium," *Transportation Research Record*, vol. 1964, pp. 185–192, 2006.

[124] X. Hu, D. Ralph, E. K. Ralph, P. Bardsley, and M. C. Ferris, "Electricity Generation with Looped Transmission Networks: Bidding to an ISO," research paper no.2004/16, Judge Institute of Management, Cambridge University, 2004.

[125] M. C. Ferris, R. Einarsson, Z. Jiang, and D. M. Shepard, "Sampling Issues for Optimization in Radiotherapy," *Annals of Operations Research*, vol. 148, pp. 95–116, 2006.

[126] M. C. Ferris, A. J. Wathen, and P. Armand, "Limited Memory Solution of Bound Constrained Convex Quadratic Problems Arising in Video Games," *RAIRO - Operations Research*, vol. 41, pp. 19–34, Jan. 2007.

[127] M. C. Ferris, G. Deng, D. G. Fryback, and V. Kuruchittham, "Breast cancer epidemiology: calibrating simulations via optimization," *Oberwolfach Reports*, vol. 2, pp. 89–92, 2005.

[128] K. Volrathongchia, P. F. Brennan, and M. C. Ferris, "Predicting the likelihood of falls among the elderly using likelihood basis pursuit technique," *American Medical Informatics Association 2005 Symposium Proceedings*, pp. 764–768, 2006.

[129] P. F. Brennan, M. Ferris, S. Robinson, S. Wright, and J. Marquard, "Modeling Participation in the NHII: Operations Research Approach," *American Medical Informatics Association 2005 Symposium Proceedings*, pp. 76–80, 2005.

[130] X. Ban, H. X. Liu, M. C. Ferris, and B. Ran, "A Link-Node Complementarity Model and Solution Algorithm for Dynamic User Equilibria with Exact Flow Propogations," *Transportation Research Part B: Methodological*, vol. 42, no. 9, pp. 823–842, 2008.

[131] Z. Jiang, M. C. Ferris, M. A. Earl, and D. M. Shepard, "Clinical Implementation of Automated Planning for 3D-Conformal Therapy," *Medical Physics*, vol. 32, p. 2032, 2005.

[132] X. Ban, H. X. Liu, M. C. Ferris, and B. Ran, "A general MPCC model and its solution algorithm for continuous network design problem," *Mathematical and Computer Modelling*, vol. 43, pp. 493–505, Mar. 2006.

[133] X. Ban, H. X. Liu, and M. C. Ferris, "A Link-Node Based Complementarity Model and its Solution Algorithm for Asymmetric User Equilibria," in *Proceedings of the 85th Transportation Research Board Annual Meeting (CD-ROM)*, 2006.

[134] G. Deng and M. C. Ferris, "Neuro-Dynamic Programming for Fractionated Radiotherapy Planning," in *Optimization in Medicine, International Center for Mathematics* (C. J. S. Alves, P. M. Pardalos, and L. N. Vicente, eds.), Springer Optimization and Its Applications, pp. 47–70, Springer New York, 2008.

[135] J. Wallace, A. B. Philpott, M. O'Sullivan, and M. C. Ferris, "Optimal Rig Design using Mathematical Programming," in *2nd High Performance Yacht Design Conference, Auckland, 14–16 February, 2006*, pp. 185–192, 2006.

[136] A. Muetze and M. C. Ferris, "Branch and Bound Based Global Optimization of Permanent Magnet Machines - Experiences with Different Problem Formulations," tech. rep., University of Wisconsin, 2006.

[137] X. Ban, H. X. Liu, and M. C. Ferris, "A Link-Node Based Complementarity Model and its Solution Algorithm for Dynamic User Equilibria with Exact Flow Propagations," in *Proceedings of the First International Conference on Dynamic Traffic Assignment*, University of Leeds, UK, 2006.

[138] X. Ban, M. C. Ferris, and H. X. Liu, "Numerical studies on reformulation techniques for continuous network design with asymmetric user equilibrium," *International Journal of Operations Research and Information Systems*, vol. 1, pp. 52–72, 2010.

[139] G. Deng and M. C. Ferris, "Adaptation of the UOBQYA Algorithm for Noisy Functions," in *Proceedings of the 2006 Winter Simulation Conference* (L. Felipe˜Perrone, B. Lawson, J. Liu, and F. Wieland, eds.), pp. 312–319, 2006.

[140] G. Deng and M. C. Ferris, "Variable-number sample-path optimization," *Mathematical Programming*, vol. 117, pp. 81–109, July 2009.

[141] G. Deng, P. Prakash, M. C. Converse, J. G. Webster, and M. C. Ferris, "A Two-Phase Optimization Framework for Designing Coaxial Antennas for Hepatic Microwave Ablation," tech. rep., Computer Sciences Department, University of Wisconsin, 2007.

[142] P. Prakash, G. Deng, M. C. Converse, J. G. Webster, D. M. Mahvi, and M. C. Ferris, "Design Optimization of a Robust Sleeve Antenna for Hepatic Microwave Ablation," *Physics in Medicine and Biology*, vol. 53, pp. 1057–1069, 2008.

[143] M. C. Ferris, P. F. Brennan, L. M. Tang, J. Marquard, S. M. Robinson, and S. J. Wright, "Creating Operations Research Models to Guide RHIO Decision Making," in *American Medical Informatics Association 2007 Symposium Proceedings*, 2007.

[144] G. Deng and M. C. Ferris, "Extension of the DIRECT Optimization Algorithm for Noisy Functions," in *Proceedings of the 2007 Winter Simulation Conference* (B. Biller, S. Henderson, M. Hsieh, and J. Shortle, eds.), pp. 497–504, 2007.

[145] E. B. Fisher, R. P. O'Neill, and M. C. Ferris, "Optimal Transmission Switching," *IEEE Transactions on Power Systems*, vol. 23, pp. 1346–1355, 2008.

[146] M. R. Bussieck, M. C. Ferris, and A. Meeraus, "Grid-enabled optimization with GAMS," *INFORMS Journal on Computing*, vol. 21, pp. 349–362, Aug. 2009.

[147] M. C. Ferris, C. T. Maravelias, and A. Sundaramoorthy, "Simultaneous Batching and Scheduling Using Dynamic Decomposition on a Grid," *INFORMS Journal on Computing*, vol. 21, no. 3, pp. 398–410, 2009.

[148] M. C. Ferris and G. Deng, "Classification-Based Global Search: An Application to a Simulation for Breast Cancer," in *Proceedings of the NSF CMMI Engineering Research and Innovation Conference*, 2008.

[149] M. C. Ferris, O. L. Mangasarian, and S. J. Wright, *Linear Programming with MATLAB*. No. 7 in MPS-SIAM Series on Optimization, Philadelphia, PA: Society for Industrial & Applied Mathematics (SIAM), Jan. 2007.

[150] G. Deng and M. C. Ferris, "WISOPT: A Framework for Simulation Optimization." Manuscript, submitted for publication, 2007.

[151] M. C. Ferris, C. T. Maravelias, and A. Sundaramoorthy, "Using Grid Computing to Solve Hard Planning and Scheduling Problems," in *Proceedings of 18th European Symposium on Computer-Aided Process Engineering (ESCAPE 18)kin*, (Lyon, France), June 2008.

[152] M. C. Ferris, S. P. Dirkse, J.-H. Jagla, and A. Meeraus, "Extending Modeling Systems: Structure and Solution," in *Proceedings of the Fifth International Conference on Foundations of Computer-Aided Process Operations (FOCAPO 2008)* (M. Ierapetriou, M. Bassett, and S. Pistikopoulos, eds.), (Cambridge, MA), Omni Press, 2008.

[153] X. Ban, S. Lu, M. C. Ferris, and H. X. Liu, "Risk-Averse Second Best Toll Pricing," in *Proceedings of the 18th International Symposium of Transportation and Traffic Theory (ISTTT 18)* (W. H. K. Lam, S. C. Wong, and H. K. Lo, eds.), pp. 197–218, Springer, 2009.

[154] M. C. Ferris, S. P. Dirkse, J.-H. Jagla, and A. Meeraus, "An Extended Mathematical Programming Framework," *Computers and Chemical Engineering*, vol. 33, pp. 1973–1982, 2009.

[155] E. B. Fisher, K. W. Hedman, R. P. O'Neill, M. C. Ferris, and S. S. Oren, "Optimal Transmission Switching in Electrical Networks for Improved Economic Operations," in *INFRADAY Conference*, 2008.

[156] O. L. Mangasarian and M. C. Ferris, "Uniqueness of Integer Solution of Linear Equations," *Optimization Letters*, vol. 4, pp. 559–565, 2010.

[157] X. Ban, M. C. Ferris, L. M. Tang, and S. Lu, "Risk-neutral second best toll pricing," *Transportation Research Part B: Methodological*, vol. 48, pp. 67–87, 2013.

[158] K. W. Hedman, M. C. Ferris, R. P. O'Neill, E. B. Fisher, and S. S. Oren, "Co-optimization of Generation Unit Commitment and Transmission Switching with N-1 Reliability," *IEEE Transactions on Power Systems*, vol. 25, no. 2, pp. 1052–1063, 2010.

[159] C. Bredendick and M. C. Ferris, "Facebook friend wheels and quadratic assignment problems," *Optima*, vol. 20, pp. 7–11, 2009.

[160] A. Gunawardena, M. C. Ferris, and R. R. Meyer, "A network approach for segmentation in intensity modulated arc therapy," *Optimization Methods and Software*, vol. 28, pp. 276—-299, Apr. 2013.

[161] Q. Li, M. C. Ferris, and T. S. Munson, "Linear Algebra Enhancements to the PATH Solver," technical repo, University of Wisconsin, Madison, Wisconsin, 2009.

[162] M. C. Ferris, "Coupled Models for Planning and Operation of Power Systems on Multiple Scales," in *Computational Needs for the Next Generation Electric Grid Proceedings* (J. Eto and R. Thomas, eds.), vol. LBNL-5105E, Apr. 2011.

[163] M. R. Bussieck, M. C. Ferris, and T. Lohmann, "GUSS: Solving Collections of Data Related Models within GAMS," in *Algebraic Modeling Systems – Modeling and Solving Real World Optimization Problems* (J. Kallrath, ed.), pp. 35–56, Springer-Verlag, Dec. 2011.

[164] M. C. Ferris, "Extended Mathematical Programming: Competition and Stochasticity," in *SIAM News*, pp. 1–2, 2012.

[165] M. C. Ferris and Y. Liu, "Modeling demand response in organized wholesale energy markets," *Optimization Methods and Software*, vol. 31, pp. 1064–1088, May 2016.

[166] D. Chasman, B. Gancarz, L. Hao, M. Ferris, P. Ahlquist, and M. Craven, "Inferring host subnetworks involved in viral replication," *PLOS Computational Biology*, vol. 10, p. e1003626, May 2014.

[167] W. Britz, M. Ferris, and A. Kuhn, "Modeling Water Allocating Institutions based on Multiple Optimization Problems with Equilibrium Constraints," *Environmental Modelling & Software*, vol. 46, pp. 196–207, Aug. 2013.

[168] L. Tang and M. C. Ferris, "A Hierarchical Framework for Long-Term Power Planning Models," *IEEE Transactions on Power Systems*, vol. 30, pp. 46–56, Jan. 2015.

[169] Y. Liu and M. C. Ferris, "Payment Rules for Unit Commitment Dispatch," *The Electricity Journal*, vol. 26, no. 4, pp. 34–44, 2013.

[170] F. Alexander, M. Anitescu, J. Bell, D. Brown, M. Ferris, M. Luskin, S. Mehrotra, B. Moser, A. Pinar, A. Tartakovsky, K. Willcox, S. Wright, and V. Zavala, "A multifaceted mathematical approach for complex systems," tech. rep., LBNL, Mar. 2012.

[171] H. Dong, M. C. Ferris, T. Cox, and J. Norman, "Analyzing the benefits of manure separation using mathematical optimization," in *American Society of Agricultural and Biological Engineers (ASABE) International Meeting*, 2013.

[172] Y. Liu, J. T. Holzer, and M. C. Ferris, "Extending the Bidding Format to Promote Demand Response," *Energy Policy*, vol. 86, pp. 82–92, Nov. 2015.

[173] A. B. Philpott, M. C. Ferris, and R. J. B. Wets, "Equilibrium, uncertainty and risk in hydrothermal electricity systems," *Mathematical Programming B*, vol. 157, pp. 483–513, Jan. 2016.

[174] N. Vaish, M. C. Ferris, and D. Wood, "Optimization models for three on-chip network problems," *ACM Transactions on Architecture and Code Optimization*, vol. 13, pp. 1–27, Sept. 2016.

[175] T. Nowatzki, M. Ferris, K. Sankaralingam, C. Estan, N. Vaish, and D. Wood, *Optimization and Mathematical Modeling in Computer Architecture*, vol. 8 of *Synthesis Lectures on Computer Architecture*. Morgan & Claypool Publishers, Sept. 2013.

[176] M. Loewe, M. C. Ferris, M. R. Bussieck, and L. Westermann, *Stochastic Programming within Extended Mathematical Programming*, 2013.

[177] R. S. Russ, S. R. Wangen, D. L. Nye, R. B. Shapiro, W. Strinz, and M. C. Ferris, "Fields of Fuel: Using a video game to support evidence-based reasoning about sustainability," *The Science Teacher*, vol. 82, pp. 49–54, Mar. 2015.

[178] E. Ritz, D. D. Pollard, and M. C. Ferris, "The influence of fault geometry on small strike-slip fault mechanics," *Journal of Structural Geology*, vol. 73, pp. 49—-63, 2015.

[179] Y. Liu, M. C. Ferris, and F. Zhao, "Computational study of security constrained economic dispatch with multi-stage rescheduling," *IEEE Transactions on Power Systems*, vol. 30, pp. 920–929, Mar. 2015.

[180] T. M. Neeson, M. C. Ferris, M. W. Diebel, P. J. Doran, J. R. O'Hanley, and P. B. McIntyre, "Enhancing ecosystem restoration efficiency through spatial and temporal coordination.," *Proceedings of the National Academy of Sciences of the United States of America*, vol. 112, no. 19, pp. 6236—-6241, 2015.

[181] D. K. Molzahn, Z. B. Friedman, B. C. Lesieutre, C. L. DeMarco, and M. C. Ferris, "Estimation of Constraint Parameters in Optimal Power Flow Data Sets," in *North American Power Symposium (NAPS)*, Institute of Electrical & Electronics Engineers (IEEE), Oct. 2015.

[182] Y. Liu, M. C. Ferris, F. Zhao, T. Zheng, and E. Litvinov, "A Stochastic Unit Commitment with Derand Technique for ISO's Reserve Adequacy Assessment," in *2015 IEEE Power & Energy Society General Meeting*, Institute of Electrical & Electronics Engineers (IEEE), July 2015.

[183] Y. Liu and M. C. Ferris, "Security Constrained Economic Dispatch using Semidefinite Programming," in *2015 IEEE Power & Energy Society General Meeting*, Institute of Electrical & Electronics Engineers (IEEE), July 2015.

[184] F. Beaudry, M. C. Ferris, A. M. Pidgeon, and V. C. Radeloff, "Identifying areas of optimal multispecies conservation value by accounting for incompatibilities between species," *Ecological Modelling*, vol. 332, pp. 74–82, July 2016.

[185] H. Mazhar, D. Melanz, M. C. Ferris, and D. Negrut, "An analysis of several methods for handling hard-sphere frictional contact in rigid multibody dynamics," technical report, University of Wisconsin, 2014.

[186] M. Loewe and M. Ferris, "Stochastic programming techniques: a case study using gams and extended mathematical programming for optimal powerflow," technical report, University of Wisconsin, 2015.

[187] A. T. Moody, T. M. Neeson, S. Wangen, J. Dischler, M. W. Diebel, M. Herbert, M. Khoury, E. Yacobson, P. J. Doran, M. C. Ferris, J. R. O'Hanley, and P. B. McIntyre, "Pet project or best project? Online decision support tools for prioritizing barrier removals in the Great Lakes and beyond," *Fisheries*, vol. 42, pp. 57–65, Jan. 2017.

[188] A. Del Pia, M. C. Ferris, and C. Michini, "Totally unimodular congestion games," in *Proceedings of the Twenty-Eighth Annual ACM-SIAM Symposium on Discrete Algorithms*, Society for Industrial & Applied Mathematics (SIAM), Jan. 2017. http://www.optimization-online.org/DB_HTML/2015/11/5193.html.

[189] A. Tayyebi, T. D. Meehan, J. Dischler, G. Radloff, M. Ferris, and C. Gratton, "SmartScape: A web-based decision support system for assessing the tradeoffs among multiple ecosystem services under crop-change scenarios," *Computers and Electronics in Agriculture*, vol. 121, pp. 108–121, 2016.

[190] Y. Kim, O. Huber, and M. C. Ferris, "A structure-preserving pivotal method for affine variational inequalities," *Mathematical Programming Computation*, vol. 168, pp. 93–121, Mar. 2017.

[191] J. V. Outrata, M. C. Ferris, M. Červinka, and M. Outrata, "On Cournot-Nash-Walras equilibria and their computation," *Set-Valued and Variational Analysis*, vol. 24, pp. 387–402, June 2016.

[192] L. Loewe, K. S. Scheuer, S. A. Keel, V. Vyas, B. Liblit, B. Hanlon, M. C. Ferris, J. Yin, I. Dutra, A. Pietsch, C. G. Javid, C. L. Moog, J. Meyer, J. Dresel, B. McLoone, S. Loberger, A. Movaghar, M. Gilchrist-Scott, Y. Sabri, D. Sescleifer, I. Pereda-Zorrilla, A. Zietlow, R. Smith, S. Pietenpol, J. Goldfinger, S. L. Atzen, E. Freiberg, N. P. Waters, C. Nusbaum, E. Nolan, A. Hotz, R. M. Kliman, A. Mentewab, N. Fregien, and M. Loewe, "Evolvix BEST names for semantic reproducibility across code2brain interfaces," *Annals of the New York Academy of Sciences*, vol. 1387, pp. 124–144, Dec. 2016.

[193] B. Park, L. Tang, M. C. Ferris, and C. L. DeMarco, "Examination of three different ACOPF formulations with generator capability curves," *IEEE Transactions on Power Systems*, vol. 32, pp. 2913–2923, July 2017.

[194] A. W. Milt, P. J. Doran, M. C. Ferris, A. T. Moody, T. M. Neeson, and P. B. McIntyre, "Local-scale benefits of river connectivity restoration planning beyond jurisdictional boundaries," *River Research and Applications*, vol. 33, pp. 788–795, Feb. 2017.

[195] M. Habibian, G. Zakeri, A. Downward, M. F. Anjos, and M. Ferris, "Co-optimization of demand response and interruptible load reserve offers for a price-making major consumer," *Energy Systems*, pp. 1–27, Nov. 2018.

[196] S. R. Wangen, H. D. Rodriguez, D. Liang, A. Christensen, M. Ferris, and V. E. Cabrera, "Development of an integrated dairy farm decision support system to facilitate dairy management – i: Data integration and warehousing," *Journal of Dairy Science*, vol. 101, no. Suppl. 2, p. 320, 2018.

[197] A. Christensen, H. Delgado, D. Liang, S. R. Wangen, M. Ferris, and V. E. Cabrera, "Development of an integrated dairy farm decision support system to facilitate dairy management – ii: Analysis from integrated data," *Journal of Dairy Science*, vol. 101, no. Suppl. 2, p. 321, 2018.

[198] A. Christensen, H. Dong, J. Ramakrishnan, M. Sharara, and M. Ferris, "Valuation of technology options for nutrient management under different environmental policy regimes," tech. rep., University of Wisconsin, 2017.

[199] M. T. Wortel, E. Noor, M. Ferris, F. J. Bruggeman, and W. Liebermeister, "Metabolic enzyme cost explains variable trade-offs between microbial growth rate and yield," *PLOS Computational Biology*, vol. 14, p. e1006010, Feb. 2018.

[200] T. M. Neeson, P. J. Doran, M. C. Ferris, K. B. Fitzpatrick, M. Herbert, M. Khoury, A. T. Moody, J. Ross, E. Yacobson, and P. B. McIntyre, "Conserving rare species can have high opportunity costs for common species," *Global Change Biology*, vol. 24, pp. 3862–3872, Apr. 2018.

[201] A. W. Milt, M. W. Diebel, P. J. Doran, M. C. Ferris, M. Herbert, M. L. Khoury, A. T. Moody, T. M. Neeson, J. Ross, T. Treska, J. R. O'Hanley, L. Walter, S. R. Wangen, E. Yacobson, and P. B. McIntyre, "Minimizing opportunity costs to aquatic connectivity restoration while controlling an invasive species," *Conservation Biology*, vol. 32, pp. 894–904, May 2018.

[202] T. M. Neeson, A. T. Moody, J. R. O'Hanley, M. Diebel, P. J. Doran, M. C. Ferris, T. Colling, and P. B. McIntyre, "Aging infrastructure creates opportunities for cost-efficient restoration of aquatic ecosystem connectivity," *Ecological Applications*, vol. 28, pp. 1494–1502, June 2018.

[203] Y. Kim and M. C. Ferris, "Solving equilibrium problems using extended mathematical programming," *Mathematical Programming Computation*, Mar. 2019. Online first.

[204] M. C. Ferris and A. B. Philpott, "Dynamic risked equilibrium," *Operations Research*, 2018. Submitted.

[205] W. Chang, M. C. Ferris, Y. Kim, and T. F. Rutherford, "Solving stochastic dynamic programming problems: a mixed complementarity approach," *Computational Economics*, 2018. Submitted.

[206] B. Park, M. C. Ferris, and C. L. DeMarco, "Sparse tableau approach for power system analysis and design," in *North American Power Symposium (NAPS)*, IEEE, 2018.

[207] M. C. Ferris, O. Huber, and Y. Kim, "Solving stochastic equilibria: Emp, selkie, and optimal value functions," *Oberwolfach Reports*, vol. 38, 2018.

[208] K. Fitzpatrick, A. Moody, A. Milt, M. Herbert, M. Khoury, E. Yacobson, J. Ross, P. Doran, M. Ferris, P. McIntyre, and T. Neeson, "Can indicator and umbrella species guide conservation investments to restore connectivity in great lakes tributaries?," *Biological Conservation*, 2018. Submitted.

[209] B. Park, M. C. Ferris, and C. L. DeMarco, "Benefits of sparse tableau approach for power system analysis and design," *IEEE Transactions on Power Systems*, May 2019. Accepted.

[210] J. Zhang, B. E. McIntosh, B. Wang, M. E. Brown, M. D. Probasco, S. Webster, B. Duffin, Y. Zhou, L.-W. Guo, W. J. Burlingham, C. Kent, M. Ferris, and J. A. Thomson, "A human pluripotent stem cell-based screen for smooth muscle cell differentiation and maturation identifies inhibitors of intimal hyperplasia," *Stem Cell Reports*, May 2019.

[211] M. C. Ferris and A. B. Philpott, "Electricity markets and renewable energy," *SIAM News*, 2019. Submitted.

[212] M. C. Ferris and A. B. Philpott, "100 % renewable energy with storage," *Operations Research*, May 2019. Submitted.

[213] M. Ferris, A. Christensen, and S. Wangen, "Optimized decisions using big data analytics in dairy farms," *Journal of Dairy Science*, vol. 102, no. Suppl. 1, p. 323, 2019.

[214] A. Birchfield, R. D. Christie, C. Coffrin, M. Ferris, C. Josz, R. Korab, B. Leseuitre, D. Molzahn, T. J. Overbye, and R. Zimmerman, "The power grid library for benchmarking AC optimal power flow algorithms," tech. rep., IEEE PES PGLib Task Force, 2019.

[215] Y. Kim and M. C. Ferris, "Selkie: a model transformation and distributed solver for structured equilibrium problems," *In preparation*, 2019.