Jeffrey T. Linderoth

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A Education and Employment

Degrees

- Ph.D. in Industrial Engineering
  Georgia Institute of Technology, Atlanta, GA
  Thesis: *Topics in Parallel Integer Optimization*
  Advisor: Martin Savelsbergh
  Graduation Date: August 1998

- M.S. in Operations Research
  Georgia Institute of Technology, Atlanta, GA
  Graduation Date: September 1994

- B.S. (with highest honors) in General Engineering
  University of Illinois at Urbana-Champaign
  Graduation Date: May 1992

Appointments

UNIVERSITY OF WISCONSIN-MADISON	Madison, WI
Professor of Industrial and Systems Engineering	2011 - PRESENT
Professor of Computer Science (by courtesy)	2011 - PRESENT
Discovery Fellow, Wisconsin Institutes of Discovery,	2012 - PRESENT
Associate Professor of Industrial and Systems Engineering	2008 - 2011
Associate Professor of Computer Science (by courtesy)	2008 - 2011
Assistant Professor of Industrial and Systems Engineering	2007 - 2008
Assistant Professor of Computer Science (by courtesy)	2007 - 2008
ÉCOLE POLYTECHNIQUE	Paris, France
Professeur Invité, Laboratoire d'Informatique	2015
UNIVERSITÉ BORDEAUX 1	Bordeaux, France
Professeur Invité, Institut de Mathematiques de Bordeaux (IMB)	2009
LEHIGH UNIVERSITY	Bethlehem, PA
Adjunct Associate Professor of Industrial and Systems Engineering	2008 - 2010
Adjunct Assistant Professor of Industrial and Systems Engineering	2007 - 2008
Assistant Professor of Industrial and Systems Engineering	2002 - 2007

AXIOMA, INC. — Marietta, GA
Senior Consultant — 2000-2002

ARGONNE NATIONAL LAB — Argonne, IL
Enrico Fermi Scholar — 1999-2000
Postdoctoral Research Assistant, Mathematics and Computer Science Division — 1998-1999

GEORGIA INSTITUTE OF TECHNOLOGY — Atlanta, GA
Graduate Research Assistant, School of Industrial and Systems Engineering — 1993-1998
Graduate Teaching Assistant, School of Industrial and Systems Engineering — 1992-1993

UNITED STATES GEOLOGICAL SURVEY — Urbana, IL
Research Assistant — 1991-1992

UNIVERSITY OF ILLINOIS AT URBANA-CHAMPAIGN — Urbana, IL
Undergraduate Research Assistant — 1990-1992

Professional Memberships

- Institute for Operations Research and Management Science (INFORMS), 1992-present
  - INFORMS Optimization Society 1992-present
  - INFORMS Computing Society 1992-present
- Mathematical Optimization Society (MOS) 1994-present
- Society for Industrial and Applied Mathematics (SIAM) 2003-present

B Honors and Awards

Personal Awards

2014 ICS Prize (with J. Ostrowski, F. Rossi, and S. Smriglio)

2014 Runner-up, best paper published in *Computational Optimization and Applications* in 2014, (with M. Kılınç, J. Luedtke, and A. Miller).

2013 Polygon Engineering Council Outstanding Instructor, ISyE, University of Wisconsin-Madison.

2012 Recognition for one of 22 most influential papers in history of the Conference on High-Performance and Distributed Computing. (`http://www.hpdc.org/best.php`)

2012 Polygon Engineering Council Outstanding Instructor, ISyE, University of Wisconsin-Madison.

2011 Polygon Engineering Council Outstanding Instructor, ISyE, University of Wisconsin-Madison.

2010 Honorable Mention, Best paper at the 47th Design Automation Conference

2009 Polygon Engineering Council Outstanding Instructor, ISyE, University of Wisconsin-Madison.

2008 University Housing's Honored Instructor Award, University of Wisconsin-Madison

2006 Eleanor & Joseph F. Libsch Early Career Research Award, Lehigh University

2005 Department of Energy Early Career Principal Investigator Award: Applied Mathematics, Computer Science, and High-Performance Networks

2005 IBM Faculty Partnership Award

2005 Lehigh Engineering Ingenuity Award for Exceptional Accomplishment in Teaching and/or Research by a Junior Faculty Member

2003 Award for best paper published in *Computational Optimization and Applications* in 2003. (with S. J. Wright)

2002 SIAM Activity Group on Optimization Prize, (with K. Anstreicher, N. Brixius, and J.-P. Goux)

2000 Outstanding paper award, *Ninth IEEE International Symposium on High Performance Distributed Computing* (with J.-P. Goux and M. Yoder)

1999 Enrico Fermi Scholar, Argonne National Lab

Student Awards

2009 INFORMS Nicholson Prize, 2^{nd} place, Jim Ostrowski

C Publications

Refereed Journal Publications

[1] B. Kocuk, H. Jeon, S. Dey, J. Linderoth, J. Luedtke, and A. Sun, "A Cycle-Based Formulation and Valid Inequalities for DC Power Transmission Problems with Switching", *Operations Research*, to appear, 2016.

[2] H. Jeon, J. Linderoth, and A. Miller, "Quadratic Cone Cutting Surfaces for Quadratic Programs with On-Off Constraints", *Discrete Optimization*, to appear, 2016.

[3] O. Alagoz, M. Ayvaçi, and J. T. Linderoth, "Optimally Solving Markov Decision Processes with Total Expected Discounted Reward Function: Linear Programming Revisited", *Computers and Industrial Engineering*, 87:311-316, 2015.

[4] M. Kılınç, J. Linderoth, J. Luedtke, and A. Miller "Strong Branching Inequalities for Convex Mixed Integer Nonlinear Programs", *Computational Optimization and Applications*, 59:639-665, 2014.

[5] S. Sridhar, J. Linderoth, and J. Luedtke, "Models and Solution Techniques for Production Planning Problems with Increasing Byproducts", *Journal of Global Optimization*, 59:597-631, 2014.

[6] S. Sridhar, J. Linderoth, and J. Luedtke, "Locally Ideal Formulations for Piecewise Linear Functions with Indicator Variables", *Operations Research Letters*, 41:627-632, 2013.

[7] P. Belotti, C. Kirches, S. Leyffer, J. Linderoth, J. Luedtke, and A. Mahajan, "Mixed-Integer Nonlinear Optimization," *Acta Numerica*, 22:1-131, 2013.

[8] T. Wu, A. Davoodi, and J. T. Linderoth, "Power-Driven Global Routing for Multi-Supply Voltage Domains", *VLSI Design*, 2013:1-12, 2013.

[9] J. Luedtke, M. Namazifar, and J. T. Linderoth, "Some Results on the Strength of Relaxations of Multilinear Functions", *Mathematical Programming, Series B*, 136:325-351, 2012.

[10] M. Freimer, J. T. Linderoth, and D. Thomas, "The Impact of Sampling Methods on Bias and Variance in Stochastic Linear Programs," *Computational Optimization and Applications*, 51:51-75, 2012.

[11] J. Ostrowski, J. T. Linderoth, F. Rossi, and S. Smriglio, "Orbital Branching," *Mathematical Programming*, 126:147-178, 2011.

[12] M. Altunay, S. Leyffer, J. T. Linderoth, and Z. Xie, "Optimal Response to Attacks on The Open Science Grid" *Computer Networks*, 55:61-73, 2011.

[13] J. Ostrowski, J. T. Linderoth, F. Rossi, and S. Smriglio, "Solving Large Steiner Triple Covering Problems," *Operations Research Letters*, 39:127-131, 2011.

[14] T. Wu, A. Davoodi, and J. T. Linderoth, "GRIP: Global Routing via Integer Programming", *IEEE Transactions on Computer Aided Design*, 30:72-84, 2011.

[15] B. Gemici, S. D. Wu, J. T. Linderoth, and J. Moore, "R&D Project Portfolio Analysis for the Semiconductor Industry," *Operations Research*, 58:1548-1563, 2010.

[16] K. Abhishek, S. Leyffer, and J. T. Linderoth, "FilMINT: An Outer-Approximation-Based Solver for Nonlinear Mixed Integer Programs," *INFORMS Journal on Computing*, 22:555-567, 2010.

[17] O. Günlük and J. T. Linderoth, "Perspective Relaxation of Mixed Integer Nonlinear Programs with Indicator Variables," *Mathematical Programming, Series B*, 104:183-206, 2010.

[18] K. Abhishek, S. Leyffer, and J. T. Linderoth, "Modeling without Categorical Variables: A Mixed-Integer Nonlinear Program for the Optimization of Thermal Insulation Systems," *Optimization and Engineering*, 11:185-212, 2010.

[19] J. Linderoth, F. Margot, and G. Thain, "Improving Bounds on the Football Pool Problem via Symmetry Reduction and High-Throughput Computing," *INFORMS Journal on Computing*, 21:445-457, 2009.

[20] W. Glankwamdee, J. T. Linderoth, P. Connard, J. Hutton, and J. Shen, "Combining Optimization and Simulation for Strategic and Operational Industrial Gas Production and Distribution," *Computers and Chemical Engineering*, 32:2536-2546, 2008.

[21] U. Janjarassuk and J. T. Linderoth, "Reformulation and Sampling to Solve a Stochastic Network Interdiction Problem," *Networks*, 52:120-132, 2008.

[22] J. T. Linderoth, A. Shapiro, and S. J. Wright, "The Empirical Behavior of Sampling Methods for Stochastic Programming," *Annals of Operations Research*, 142:219-245, 2006.

[23] J. T. Linderoth, "A Simplicial Branch-and-Bound Algorithm for Solving Quadratically Constrained Quadratic Programs," *Mathematical Programming, Series B*, 103:251-282, 2005.

[24] J. T. Linderoth and S. J. Wright, "Implementing a Decomposition Algorithm for Stochastic Programming on a Computational Grid," *Computational Optimization and Applications*, 24:207-250, 2003.

[25] K. Anstreicher, N. Brixius, J.-P. Goux and J. T. Linderoth, "Solving Large Quadratic Assignment Problems on Computational Grids," *Mathematical Programming, Series B*, 91:563-588, 2002.

[26] P. Bauer, J. T. Linderoth, and M. W. P. Savelsbergh, "A Branch and Cut Approach to the Cardinality Constrained Circuit Problem," *Mathematical Programming*, 9:307-348, 2002.

[27] J. T. Linderoth, E. K. Lee, and M. W. P. Savelsbergh, "A Parallel, Linear Programming Based Heuristic for Large Scale Set Partitioning Problems," *INFORMS Journal on Computing*, 13:191-209, 2001.

[28] J.-P. Goux, S. Kulkarni, J. T. Linderoth, and M. E. Yoder, "Master-Worker: An Enabling Framework for Applications on the Computational Grid," *Cluster Computing*, 4:63-70, 2001.

[29] 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*, 103:17-32, 2001.

[30] A. Atamtürk, E. L. Johnson, J. T. Linderoth and M. W. P. Savelsbergh, "A Relational Modeling System for Linear and Integer Programming," *Operations Research*, 48:846-857, 2000.

[31] J. T. Linderoth and M. W. P. Savelsbergh, "A Computational Study of Branch and Bound Search Strategies for Mixed Integer Programming," *INFORMS Journal on Computing*, 11:173-187, 1999.

Book Chapters

[32] O. Günlük and J. T. Linderoth, "Perspective Reformulation and Applications," *IMA Volumes in Mathematics and its Applications*, 154:61-92, 2012.

[33] P. Bonami, M. Kılınç, and J. T. Linderoth, "Algorithms and Software for Solving Convex Mixed Integer Nonlinear Programs," *IMA Volumes in Mathematics and its Applications*, 154:1-40, 2012.

[34] P. Bonami, J. Linderoth, and A. Lodi, "Disjunctive Cuts for Mixed Integer Nonlinear Programming Problems," Chapter 18 in *Progress in Combinatorial Optimization*, ISTe-Wiley, 521-541, 2011.

[35] A. Lodi and J. T. Linderoth, "MILP Software," *Encyclopedia for Operations Research and Management Science*, Wiley, 3239-3248, 2011.

[36] W. Glankwamdee and J. T. Linderoth, "MW: A Software Framework for Combinatorial Optimization on Computational Grids," E. Talbi, (ed). *Parallel Combinatorial Optimization*, John Wiley & Sons, 239-261, 2006.

[37] J. T. Linderoth and S. J. Wright, "Computational Grids for Stochastic Programming," S. Wallace and W. Ziemba (eds). *Applications of Stochastic Programming*, SIAM Mathematical Series on Optimization, 61-77, 2005.

[38] J. T. Linderoth and T. K. Ralphs, "Noncommercial Software for Mixed-Integer Linear Programming," J. Karlof (ed). *Integer Programming: Theory and Practice*, CRC Press Operations Research Series, 253-303, 2005.

Refereed Conference Publications

[39] C. Lim, J. Linderoth, and J. Luedtke, "Valid Inequalities for Separable Concave Constraints with Indicator Variables", *IPCO 2016: The Eighteenth Conference on Integer Programming and Combinatorial Optimization*, to appear, 2016.

[40] D. Shi, A. Davoodi, J. Linderoth, "A Fast Procedure for Improving the Global Routing Congestion Distribution", *Proceedings of Design, Automation and Test in Europe (DATE '16)*, to appear.

[41] G. Arastoopour, D. Williamson Shaffer, N. Chesler, W. Collier, and J. Linderoth, "Measuring the Complexity of Simulated Engineering Design Problems," *Proceedings of the ASEE Annual Conference*, 2015.

[42] N. Cho and J.T. Linderoth, "Row-Partition Branching for Set Partitioning Problems," *Proceedings of the INFORMS Computing Society Meeting*, 119-133, 2015.

[43] H. Dong and J. T. Linderoth, "On Valid Inequalities for Quadratic Programming with Continuous Variables and Binary Indicators," *IPCO 2013: The Sixteenth Conference on Integer Programming and Combinatorial Optimization*, *Lecture Notes in Computer Science*, Vol. 7801, Springer, 169-180, 2013.

[44] H. Shojaei, A. Davoodi, and J. T. Linderoth , "Planning for Local Net Congestion in Global Routing", *ISPD '13: The International Symposium on Physical Design*, 85-92, 2013.

[45] H. Shojaei, A. Davoodi, and J. T. Linderoth, "Congestion Analysis for Global Routing via Integer Programming", *International Conference on Computer-Aided Design (ICCAD '11)*, 256-262, 2011.

[46] C. D'Ambrosio, J. T. Linderoth, and J. Luedtke, "Valid Inequalities for the Pooling Problem with Binary Variables", *IPCO 2011: The Fifteenth Conference on Integer Programming and Combinatorial Optimization*, *Lecture Notes in Computer Science*, Vol. 6655, Springer, 117-129, 2011.

[47] G. Nannicini, P. Belotti, J. Lee, J. Linderoth, F. Margot, and A. Wächter, "A Probing Algorithm for MINLPs With Early Detection of Failures by SVM", *CPAIOR 2011: The 8th International Conference on Integration of Artificial Intelligence and Operations Research*, *Lecture Notes in Computer Science*, Vol. 6697, Springer, 154-169, 2011.

[48] T. Wu, A. Davoodi, and J. T. Linderoth, "Power-driven global routing for MSV domains", *Proceedings of Design, Automation and Test in Europe (DATE '11)*, 443-448, 2011.

[49] W. Glankwamdee and J. T. Linderoth, "Lookahead Branching for Mixed Integer Programming," *Proceedings of the Twelfth INFORMS Computing Society Meeting*, 130-150, 2011.

[50] T. Wu, A. Davoodi, and J. T. Linderoth, "A Parallel Integer Programming Approach to Global Routing", *Proceedings of the 47th Design Automation Conference*, 194-199, 2010. *Best paper nominee*.

[51] T. Wu, A. Davoodi, and J. T. Linderoth, "GRIP: Scalable 3D Global Routing Using Integer Programming," *Proceedings of the 46th Design Automation Conference*, 320-325, 2009.

[52] J. Ostrowski, J. Linderoth, F. Rossi, and S. Smriglio, "Constraint Orbital Branching," *IPCO 2008: The Thirteenth Conference on Integer Programming and Combinatorial Optimization*, *Lecture Notes in Computer Science*, Vol. 5035, Springer, 225-239, 2008.

[53] O. Günlük and J. T. Linderoth, "Perspective Relaxation of Mixed Integer Nonlinear Programs with Indicator Variables," *IPCO 2008: The Thirteenth Conference on Integer Programming and Combinatorial Optimization*, *Lecture Notes in Computer Science*, Springer, Vol. 5035, 1-16, 2008.

[54] J. Ostrowski, J. T. Linderoth, F. Rossi, and S. Smriglio, "Orbital Branching," M. Fischetti and D. Williamson (eds). *IPCO 2007: The Twelfth Conference on Integer Programming and Combinatorial Optimization*, *Lecture Notes in Computer Science*, Vol. 4517, Springer, 104-118, 2007.

[55] J.-P Goux, S. Kulkarni, J. T. Linderoth, and M. E. Yoder, "An Enabling Framework for Master-Worker Applications on the Computational Grid," *Proceedings of the Ninth IEEE International Symposium on High Performance Distributed Computing*, 43-50, 2000.

Technical Reports (Submitted)

[56] P. Bonami and O. Günlük and J. Linderoth, "Solving Box-Constrained Nonconvex Quadratic Programs," Submitted, 2016.

[57] N. Boland, J, Christiansen, B. Dandurand, A. Eberhard, J. Linderoth, J. Luedtke, F. Oliveira, "Combining Progressive Hedging with a Frank-Wolfe Method to Compute Lagrangian Dual Bounds in Stochastic Mixed-Integer Programming", Submitted, 2016.

[58] C. Lim, J. Linderoth, and J. Luedtke, "Valid Inequalities for Separable Concave Constraints with Indicator Variables", Submitted, 2016.

[59] P. Ohmann, D. Bingham Brown, N. Neelakandan, J. Linderoth, and B. Liblit, "Optimizing Customized Program Coverage", Submitted, 2016.

[60] G. Arastoopour, N. Chesler, J. Linderoth, and D. Williamson Shaffer, "Data-Enabled Cognitive Modeling: Validating Student Engineers Fuzzy Design-based Decision-making", Submitted, 2015.

[61] H. Dong, K. Chen, and J. Linderoth, "Regularization vs. Relaxation: A Conic Optimization Perspective of Statistical Variable Selection", Submitted, 2015.

[62] E. Anderson and J. Linderoth, "Effective Utilization of High Throughput Computing for Massive Scenario Analysis and Optimization to Minimize Cascading Risk", Submitted, 2015.

[63] J. Chen, C. Lim, P. Qian, J. Linderoth, and S. J. Wright, "Validating Sample Average Approximation Solutions with Negatively Dependent Batches", Submitted, 2014

[64] M. Kılınç, J. Linderoth, and J. Luedtke, "Effective Separation of Disjunctive Cuts for Convex Mixed Integer Nonlinear Programs", Technical Report #1681, Computer Sciences Department, University of Wisconsin-Madison, 2010.

Thesis

[65] J. Linderoth, *Topics in Parallel Integer Programming*, Ph.D. Thesis, Georgia Institute of Technology, 1998.

Edited Volumes

[66] S. Ahmed and J. T. Linderoth, "Integer Programming Under Uncertainty", *Mathematical Programming, Series B*, to appear, 2016.

[67] J. T. Linderoth and R. Musmanno, "Optimization on Grids—Optimization for Grids", *Parallel Computing*, 32:627-628, 2006.

Software Manuals

[68] J. Linderoth, G. Thain, and S. J. Wright, "User's Guide to MW," University of Wisconsin-Madison, `http://www.cs.wisc.edu/condor/mw`, 2007.

[69] J. Czyzyk, J. Linderoth, and J. Shen, "SUTIL: A Utility Library for Handling Stochastic Programs," `http://coral.ie.lehigh.edu/sutil`, 2005.

Invited Contributions in Edited Works

[70] H. Jeon and J. T. Linderoth, "Experiments with the Perspective Reformulation," *Proceedings of the European Workshop on Mixed Integer Nonlinear Programming*, April, 2010.

[71] S. Leyffer, J. T. Linderoth, J. Luedtke, A. Miller, and T. Munson, "Applications and Algorithms for Mixed Integer Nonlinear Programming," *Journal of Physics: Conference Series*, Vol. 180, 2009.

[72] J. T. Linderoth and T. K. Ralphs, "Exploiting Cyberinfrastructure to Solve Real-time Integer Programs", *Proceedings of the 2008 NSF Engineering Research and Innovation Conference*, Knoxville, Tennessee, 2008.

[73] J. T. Linderoth and S. J. Wright, "2003 COAP Best Paper Award," *Computational Optimization and Applications*, 29:123-126, 2004.

Unpublished Technical Reports

[74] J. T. Linderoth, F. Margot, and G. Thain, "The Tera-Gridiron: A Natural Turf for High-Throughput Computing," Technical Report 07T-001, Industrial and Systems Engineering, Lehigh University, 2007.

[75] C. Novoa, R. Berger, J. T. Linderoth, and R. Storer, "A Set-Partitioning-Based Model for the Stochastic Vehicle Routing Problem," Technical Report 06T-008, Industrial and Systems Engineering, Lehigh University, 2006.

[76] J.-P Goux, J. T. Linderoth, and M. E. Yoder, "Metacomputing and the Master-Worker Paradigm," Preprint ANL/MCS-P792-0200, Mathematics and Computer Science Division, Argonne National Laboratory, 2000.

[77] J. T. Linderoth and S. A. Burns, "Performance of Simulated Annealing as a Circuit Placement Optimization Method," UIUC Department of General Engineering Report 91-04, UIL U-ENG-91-3206, 1991.

Other Non-Refereed Publications

[78] J. Ostrowski, J. T. Linderoth, F. Rossi, and S. Smriglio, "Solving Steiner Triple Covering Problems," *Optima*, 83:1-7, 2010.

[79] P. Bauer, J. T. Linderoth, and M. W. P. Savelsbergh, "Facets of the Cardinality Constrained Circuit Polytope", published at *Optimization Online*: `http://www.optimization-online.org/DB_HTML/2001/07/356.html`, 2001.

[80] L. Clarke, J. T. Linderoth, E. L. Johnson, G. L. Nemhauser, R. Bhagavan, and M. Jordan, "Using OSL to Improve the Computational Results of a MIP Logistics Model", EKKNEWS, 16, 1995.

D Invited Research Seminars

Plenary Addresses and Major Invited Talks

[1] "Symmetry in Integer Programming", Twelfth International Conference on Integration of Artificial Intelligence (AI) and Operations Research (OR) techniques in Constraint Programming (CPAIOR 2015) , Barcelona, Spain, May, 2015.

[2] "Mixed Integer Nonlinear Programming", 21^{st} COMEX Belgian Mathematical Optimization Workshop, La Roche-en-Ardenne, Belgium, April, 2015

[3] "Mixed-Integer Nonlinear Optimization: Applications, Algorithms, and Computation", Mixed Integer Nonlinear Optimization Methods for Energy Systems Engineering, RWTH Aachen University, March, 2015

[4] "Cloud Computing for Optimization", TUTORIAL, INFORMS Annual Meeting, San Francisco, November, 2014.

[5] "Mixed-Integer Nonlinear Optimization: Applications, Algorithms, and Computation", MINI-TUTORIAL, with Sven Leyffer and Jim Luedtke, SIAM Optimization Conference, San Diego, May, 2014.

[6] "Relaxations for Nonconvex Structures", PLENARY, DOE ASCR Applied Math PI Meeting, with Mihai Anitescu and Henry Huang, Albuquerque, NM, August, 2013.

[7] "MINLP Wars", PLENARY, 38^{th} Annual Conference on the Mathematics of Operations Research, Dutch Operations Research Society, Lunteren, the Netherlands, January, 2013.

[8] "Cloud Computing for Optimization", ADVANCED TUTORIAL, INFORMS Computing Society Meeting, Santa Fe, January, 2013.

[9] "Computational Grids for Stochastic Programming", SEMI-PLENARY, 11^{th} Conference on Stochastic Programming (SP XI), Vienna, Austria, August 2007.

[10] "A Survey of Cyberinfrastructure in Operations Research", TUTORIAL, INFORMS 2007 Conference on O.R. Practice, Vancouver, May 2007.

[11] "The Football Pool Problem", PLENARY, Open Science Grid Consortium, All-Hands Meeting, San Diego Supercomputing Center, March 2007. q

[12] "Mixed Integer Nonlinear Programming", TUTORIAL, with S. Leyffer, INFORMS Annual Meeting, San Francisco, November 2005

[13] "Branch-and-Bound on a Computational Grid", SEMI-PLENARY, Research Center on Software Technology (RCOST), Mini-workshop on Computational Grids, Benevento, Italy, October 2005.

[14] "A Survey of Cyberinfrastructure in Operations Research", TUTORIAL, International Federation of Operations Research Societies Triennial Conference, Honolulu, July 2005.

[15] "A Branch-and-Bound Method for Nonconvex Quadratic Programming Implemented on a Computational Grid", PLENARY, High-Performance Algorithms and Software for Nonlinear Optimization, Ischia, Italy, June 2004.

Academic, Industrial, and Research Labs

[16] "Using Integer Programming for Solving Nonconvex Quadratic Programs with Box Constraints," Johns Hopkins University, February, 2016.

[17] "Valid Inequalities for Optimal Transmission Switching," Texas A&M, College Station, October, 2015.

[18] "Valid Inequalities for Optimal Transmission Switching," Imperial College, London, May, 2015.

[19] "Valid Inequalities for Optimal Transmission Switching," École Polytechnique, Paris, France, April, 2015.

[20] "Valid Inequalities for Optimal Transmission Switching," NICTA, Melbourne, Australia, October, 2014.

[21] "Symmetric Integer Linear Optimization," University of Melbourne, Australia, October, 2014.

[22] "Valid Inequalities for Optimal Transmission Switching," Lehigh University, September, 2014.

[23] "Quadratic Programming with On-Off Constraints," University of Minnesota, October, 2013.

[24] "Quadratic Programming with On-Off Constraints," Cornell University, October, 2013.

[25] "Quadratic Programming with On-Off Constraints," Universitá Di Bologna, July, 2013.

[26] "Optimization for Design and Control of Electric Power Grids," University of Pittsburgh, June, 2013.

[27] "Quadratic Programming with On-Off Constraints," Department of Industrial Engineering Seminar, University of Pittsburgh, April, 2013.

[28] "Quadratic Programming with On-Off Constraints," Department of Industrial and Operations Engineering Seminar, University of Michigan, Ann Arbor, April, 2013.

[29] "Quadratic Programming with On-Off Constraints," Operations Research Colloquium, Georgia Institute of Technology, Atlanta, March, 2013.

[30] "Multi-term Relaxations for Multi-linear Programs," Optimization Seminar, University of Newcastle, Australia, November, 2012.

[31] "Mixed Integer Nonlinear Programs with On-Off Constraints," Optimization and Applications Seminar, ETH Zurich, November, 2012.

[32] "Computational Mixed Integer Nonlinear Programming," ExxonMobil Research and Engineering, Annandale, NJ, October, 2012.

[33] "UW-Optimization Research Overview," ExxonMobil Upstream Research Center, Houston, TX, January 2012.

[34] "Multi-term Relaxations for Multi-linear Programs," GERAD/Mprime Seminar, l'Université de Montréal, September 2011.

[35] "Solving Symmetric Integer Programs," Industrial Engineering Seminar, Purdue University, March 2011.

[36] "Solving Symmetric Integer Programs," Industrial and Enterprise Systems Engineering Seminar, University of Illinois at Urbana-Champaign, April, 2010.

[37] "Solving Symmetric Integer Programs," Operations Research Colloquium, North Carolina State University, Raleigh, February, 2010.

[38] "Solving Symmetric Integer Programs," Decision, Risk, and Operations Division of the Columbia Business School, Columbia University, New York, September 2009.

[39] "A Different Perspective on Perspective Cuts," Institut de Mathématiques de Bordeaux (IMB), Université Bordeaux 1, July 2009

[40] "Constraint Orbital Branching," Institut de Mathématiques de Bordeaux (IMB), Université Bordeaux 1, March 2009

[41] "A Different Perspective on Perspective Cuts," Argonne National Lab, Argonne, IL, October 2008.

[42] "Stochastic Programming for Decision Making in an Uncertain Environment," CMU-RC Research Committee Meeting, Mount Pleasant, MI, June 2008.

[43] "Latest Developments with FilMINT," Operations Research Symposium, University of Sannio, Benevento, Italy, June 2008.

[44] "Orbital Branching," Lawrence Livermore National Lab, Livermore, CA, May 2007.

[45] "Solving Symmetric Integer Programs," IBM TJ Watson Research Center Operations Research Seminar, Yorktown Heights, February 2007.

[46] "Using a Computational Grid for Optimization," Università dell'Aquila Optimization Seminar, L'Aquila, Italy, June 2006.

[47] "Applying Integer Programming Techniques to Global Optimization Problems," SAS Institute, Inc. Cary, NC, May 2006.

[48] "Optimization on the Computational Grid," Operations Research Roundtable, Air Products & Chemicals, Allentown, PA, May 2006.

[49] "Multistage Stochastic Programming on a Computational Grid," University of California-Davis, April 2006.

[50] "Optimization on the Computational Grid," Virginia Commonwealth University, Richmond, VA, March 2006.

[51] "Using a Computational Grid for Optimization," University of Wisconsin-Madison, Madison, February 2006.

[52] "Using a Computational Grid for Optimization," University of Arizona, Tucson, February 2006.

[53] "Optimization on the Computational Grid," SAS Institute, Inc. Cary, NC, August 2005.

[54] "Multistage Stochastic Programming on a Computational Grid," Stevens Institute of Technology, April 2005.

[55] "Optimization on the Computational Grid," Penn State University, State College, PA, February 2005.

[56] "Multistage Stochastic Programming on a Computational Grid," Northwestern University, Evanston, IL, January 2005.

[57] "Building and Solving Stochastic Programs," Argonne National Lab, August 2004.

[58] "Optimization on the Computational Grid," IBM TJ Watson Research Center Operations Research Seminar, Yorktown Heights, November 2003.

[59] "Nonconvex Quadratic Programs and the Computational Grid," Argonne National Lab, September 2003.

[60] "Optimization on the Computational Grid," Carnegie Mellon GSIA Operations Research Seminar, Pittsburgh, March 2003.

[61] "Optimization Over the Internet," Lehigh University, February 2002.

[62] "Optimization Over the Internet," Georgia Institute of Technology, Atlanta, December 2001.

[63] "Optimization Over the Internet," University of North Carolina, Chapel Hill, February 2001.

[64] "Sampling-Based Methods for Stochastic Programming on Metacomputers," University of British Columbia, Vancouver, January 2001.

[65] "Decomposition Algorithms for Stochastic Programming on the Computational Grid," University of British Columbia, Vancouver, January 2001.

[66] "Metacomputing and Optimization," ILOG, Mountain View, CA, May, 2000.

[67] "Metacomputing and Optimization," University of Chicago, Graduate School of Business, April 2000.

[68] "Metacomputing and Optimization," SUNY-Buffalo, Praxair OR Colloquium, February 2000.

[69] "Metacomputing and Optimization," Sabre Decision Technologies, Dallas, January 2000.

[70] "A Parallel Solution Approach to the Set Partitioning Problem," Northwestern University, January 1999.

[71] "Topics in Parallel Integer Optimization," Argonne National Laboratory, April 1998.

[72] "Topics in Parallel Integer Optimization," University of Southern California, Los Angeles, February 1998 .

Conferences, Workshops, and Meetings

[73] "Strong Convex Nonlinear Relaxations of the Pooling Problem," 20^{th} Combinatorial Optimization Workshop, Aussois, France, January, 2016.

[74] "Strong Convex Nonlinear Relaxations of the Pooling Problem," INFORMS Annual Meeting, Philadelphia, November, 2015.

[75] "Using IP for Solving Nonconvex Quadratic Programs with Box Constraints," MINLP: A Hatchery for Modern Mathematics, Oberwolfach, Germany, October 2015.

[76] "Using IP for Solving Nonconvex Quadratic Programs with Box Constraints," 22^{nd} International Symposium on Mathematical Programming, Pittsburgh, July, 2015.

[77] "Orbital Conflict," INFORMS Computing Society Meeting, Richmond, VA, 2015.

[78] "Valid Inequalities and Computations for Optimal Transmission Switching," 19^{th} Combinatorial Optimization Workshop, Aussois, France, January, 2015.

[79] "Orbital Conflict," MIP 2014, The Ohio State University, Columbus, July, 2014.

[80] "Strong Convex Nonlinear Relaxations of the Pooling Problem," MINLP 2014, Pittsburgh, June, 2014.

[81] "Valid Inequalities & Computations for Optimal Transmission Switching," SIAM Optimization Meeting, San Diego, May, 2014.

[82] "Strengthened MILP Formulations for Indicator Activated Piecewise-linear Functions," INFORMS Optimization Meeting, Houston, March, 2014.

[83] "Production Planning with Increasing Byproducts: MINLP Formulations and MILP Approximations," EURO-INFORMS Meeting, Rome, July, 2013.

[84] "Solving Mixed Integer Polynomial Optimization Problems with MINOTAUR," INFORMS Annual Meeting, Phoenix, AZ, October 2012.

[85] "Solving Mixed Integer Polynomial Optimization Problems with MINOTAUR," 21^{st} International Symposium on Mathematical Programming, Berlin, August 2012.

[86] "Great Minds Think Alike, Disjunctive Cuts for MINLP," Valparaiso IP Workshop, Valparaiso, Chile, March 2012

[87] "Practical Polyhedral Relaxations for Multilinear Programs" 16^{th} Combinatorial Optimization Workshop, Aussois, France, January, 2012.

[88] "Designing Electric Power Grids to Minimize Cascading Blackouts," INFORMS Annual Meeting, Charlotte, NC, November 2011.

[89] "Valid Inequalities & Computations with Pooling Problems," INFORMS Annual Meeting, Charlotte, NC, November 2011.

[90] "Computationally Effective Disjunctive Cuts for Convex Mixed Integer Nonlinear Programs," SIAM Optimization Conference, Darmstadt, Germany, May 2011.

[91] "Linear and Nonlinear Inequalities for a Nonseparable Quadratic Set," SIAM Optimization Conference, Darmstadt, Germany, May 2011.

[92] "Lookahead Branching for Mixed Integer Programming," INFORMS Computing Society Meeting, Monterey, CA, January 2011.

[93] "Pooling Problems with Binary Variables," INFORMS Annual Meeting, Austin, TX, November 2010.

[94] "Solving Symmetric Integer Programs," Mini-Workshop: Exploiting Symmetry in Optimization, Oberwolfach, Germany, August 2010.

[95] "Experiments with a Stochastic Integer Program to Mitigate Electric Power Grid Cascades," 12^{th} Conference on Stochastic Programming (SP XII), Halifax, Canada, August 2010.

[96] "Solving Symmetric Integer Programs," SIAM Annual Meeting, Pittsburgh, July, 2010.

[97] "Experiments with the Perspective Reformulation," OPENING LECTURE, European Workshop on Mixed Integer Nonlinear Programming, Marseille, France, April, 2010.

[98] "Solving Steiner Triple Covering Problems," 14^{th} Combinatorial Optimization Workshop, Aussois, France, January, 2010

[99] "Strong Relaxations and Computations for Global Optimization Problems with Multilinear Terms," INFORMS Annual Meeting, San Diego, October 2009.

[100] " Pseudocost-Based Tree Size Estimation Method for Mixed Integer Programs," INFORMS Annual Meeting, San Diego, October 2009.

[101] "Strong Relaxations and Computations for Global Optimization Problems with Multilinear Terms," 20^{th} International Symposium on Mathematical Programming, Chicago, August 2009.

[102] "Feasibility Pump Heuristics for Mixed Integer Nonlinear Programs," 20^{th} International Symposium on Mathematical Programming, Chicago, August 2009.

[103] "Flexible Isomorphism Pruning," MIP 2009, University of California-Berkeley, June 2009.

[104] "Inequalities from Strong Branching Information for Mixed Integer Nonlinear Programs," Computational Issues in Mixed Integer Nonlinear Programming Workshop, Institut de Mathematiques de Bordeaux (IMB), Université Bordeaux 1, March 2009.

[105] "Models and Algorithms for Stochastic Programming," Enterprise-Wide Optimization Workshop, Carnegie Mellon University, Pittsburgh, March 2009.

[106] "Latest Developments with FilMINT," INFORMS Computing Society National Meeting, Charleston, January 2009.

[107] "MINLP Wars: Building an Effective Solver for Convex Mixed Integer Nonlinear Programs," Institute for Mathematics and Its Applications, "Hot Topics" Workshop on Mixed Integer Nonlinear Programming, Minneapolis, November 2008.

[108] "Constraint Orbital Branching," INFORMS Annual Meeting, Washington DC, October 2008.

[109] "Perspective Relaxation of Mixed Integer Nonlinear Programs with Indicator Variables," IPCO 2008, Bertinoro, Italy, May 2008.

[110] "Feasibility Pump Heuristics for Mixed Integer Nonlinear Programs," SIAM Conference on Optimization, Boston, May 2008.

[111] "Constraint Orbital Branching," INFORMS Optimization Meeting, Atlanta, March 2008.

[112] "Latest Developments with FilMINT," INFORMS Optimization Meeting, Atlanta, March 2008.

[113] "Using Computational Grids for Solving Stochastic Programs," INFORMS Annual Meeting, Seattle, November 2007.

[114] "Experiments With Solving Difficult Integer Programs on Distributed Computing Platforms," INFORMS Annual Meeting, Seattle, November 2007.

[115] "A Different Perspective on Perspective Cuts," MIP 2007, Montreal, August, 2007.

[116] "Orbital Branching," IPCO 2007, Ithaca, NY, June 2007.

[117] "Solving Hard Integer Programs with MW," Condor Week, Madison, WI, May 2007.

[118] "Strong(er) Branching for Mixed Integer Programming," Workshop on Hybrid Methods and Branching Rules in Combinatorial Optimization, Université de Montréal, September 2006.

[119] "MW: Master-Worker Middleware for Grids," INFORMS National Meeting, Pittsburgh, November, 2006.

[120] "The Football Pool Problem," 19^{th} International Symposium on Mathematical Programming, Rio de Janeiro, Brazil, August 2006.

[121] "Rescheduling Bulk Gas Production and Distribution," DIMACS Workshop on Computational Optimization and Logistics Challenges in the Enterprise (COLCE), Annandale, New Jersey, April 2006.

[122] "Condor and the Football Pool Problem," Condor Week, Madison, WI, April, 2006.

[123] "Reformulation and Sampling to Solve a Stochastic Network Interdiction Problem," INFORMS Annual Meeting, San Francisco, November 2005

[124] "A Branch-and-Bound Method for Nonconvex Quadratic Programming Implemented on a Computational Grid," 2005 International Conference on Complementarity, Duality, and Global Optimization, Blacksburg, Virginia, August 2005.

[125] "Applying Integer Programming Techniques to Global Optimization Problems," SIAM Conference on Optimization, Stockholm, May 2005.

[126] "MW: A Master-Worker Toolkit for Implementing Operations Research Algorithms on the Computational Grid," Fourth International Workshop of the EURO Working Group on Parallel Processing in Operations Research, Mont-Tremblant, Canada, January, 2005.

[127] "An Empirical Comparison of Branching Rules and Heuristic Methods in MINTO," INFORMS Computing Society (ICS) Conference, Annapolis, January 2005.

[128] "Multistage Stochastic Programming on a Computational Grid," The Tenth International Conference on Stochastic Programming, Tucson, AZ, October 2004.

[129] "Multistage Stochastic Programming on a Computational Grid," INFORMS National Meeting, Denver, October 2004.

[130] "A Survey of Cyberinfrastructure in Operations Research," Multi-Disciplinary Workshop at the Interface of Cyberinfrastructure and Operations Research, with Enterprise-wide Applications, National Science Foundation, Washington DC, August 2004.

[131] "MW: Master-Worker Middleware for Grids," Eleventh SIAM Conference on Parallel Processing for Scientific Computing, San Francisco, February, 2004.

[132] "Applying Integer Programming Techniques to Global Optimization Problems," INFORMS National Meeting, Atlanta, October 2003.

[133] "Solving Multistage Stochastic Linear Programs on the Computational Grid," INFORMS National Meeting, Atlanta, October 2003.

[134] "Nonconvex Quadratic Programs and the Computational Grid," 18^{th} International Mathematical Programming Symposium, Copenhagen, August 2003.

[135] "Parallel Computing for Branch-and-{Bound,Cut}," CORC Discussions on Mixed Integer Programming, New York, June 2003.

[136] "Optimization on the Computational Grid," INFORMS National Meeting, San Jose, November 2002.

[137] "Solving Large Quadratic Assignment Problems on Computational Grids," SIAM ACTIVITY GROUP ON OPTIMIZATION PRIZE LECTURE, 2002 SIAM Conference on Optimization, Toronto, July 2002.

[138] "Optimization Over the Internet," INFORMS Roundtable Winter Meeting, Savannah, January 2001.

[139] "Using Personal Condor to Solve Large Scale Numerical Optimization Problems," Paradyn/Condor Week, Madison, March 2001.

[140] "Metacomputing for Stochastic Optimization," 17^{th} International Mathematical Programming Symposium, Atlanta, August, 2000

[141] "MW: An Enabling Framework for Master-Worker Applications on the Computational Grid," Ninth IEEE Symposium on High Performance and Distributed Computing, Pittsburgh, August 2000.

[142] "Metacomputing and Optimization," INFORMS National Meeting, Salt Lake City, May 2000.

[143] "Integer Programming and Metacomputing," INFORMS National Meeting, Salt Lake City, May 2000.

[144] "Decomposition Algorithms for Stochastic Programming on the Computational Grid," APMOD – Applied Mathematical Programming and Modelling, London, April 2000.

[145] "Metacomputing and Optimization," INFORMS Chicago Local Chapter Meeting, March 2000.

[146] "Solving HUGE QAPs with Condor," Paradyn/Condor Week, Madison, March 2000.

[147] "Decomposition Algorithms for Stochastic Programming on the Computational Grid," INFORMS National Meeting, Philadelphia, November 1999.

[148] "PARINO: A Parallel Branch & Cut Code," INFORMS National Meeting, Cincinnati, May 1999.

[149] "Issues in Parallel Branch and Price," INFORMS National Meeting, Cincinnati, May 1999.

[150] "Issues in Parallel Branch and Price," DIMACS/RUTCOR: Discrete Optimization '99, New Brunswick, NJ, July 1999.

[151] "A Parallel Solution Approach to the Set Partitioning Problem," INFORMS National Meeting, Montreal, April 1998.

[152] "The Cardinality Constrained Circuit Problem," 16^{th} International Mathematical Programming Symposium, Lausanne, Switzerland, 1997.

[153] "Integrated Production and Distribution of Industrial Gases," INFORMS National Meeting, New Orleans, 1995.

[154] "Experiences with OSLp on the IBM SP2." Second OSL Network Group Conference, New Orleans, 1995.

E Student Supervision

Ph.D. Students, Graduated

1 Namsuk Cho, *Computational Techniques for Difficult Integer Programs*, Department of Industrial and Systems Engineering, University of Wisconsin-Madison, 2016.

2 Eric Anderson, *Computational Models for Risk and Reliability on Bulk Power Systems*, Department of Industrial and Systems Engineering, University of Wisconsin-Madison, 2015.

3 Hyemin Jeon, *Exploiting Mathematical Structure in Optimization Problems with Indicator Variables*, Department of Industrial and Systems Engineering, University of Wisconsin-Madison, 2015.

4 Srirkishna Sridhar, *Models and Algorithms for Mixed Integer Programming and Combinatorial Optimization*, (co-advised with Jim Luedtke and Stephen Wright), Department of Computer Science, University of Wisconsin-Madison, 2014.

5 Mahdi Namazifar, *Strong Relaxations and Computations for Multilinear Programming*, (co-advised with Jim Luedtke), Department of Industrial and Systems Engineering, University of Wisconsin-Madison, 2011.

6 Mustafa Kılınç, *Disjunctive Cutting Planes and Algorithms for Convex Mixed Integer Nonlinear Programming*, Department of Industrial and Systems Engineering, University of Wisconsin-Madison, 2011.

7 James Ostrowski, *Solving Symmetric Integer Programs*, Department of Industrial and Systems Engineering, Lehigh University, 2009.

8 Udom Janjarassuk, *Exploiting Parallel Processors for Effective Solutions to Stochastic Programs*, Department of Industrial and Systems Engineering, Lehigh University, 2009.

9 Wasu Glankwamdee, *Topics in Branch and Bound on Computational Grids*, Department of Industrial and Systems Engineering, Lehigh University, 2008.

10 Kumar Abhishek, *Topics in Mixed Integer Nonlinear Programming*, Department of Industrial and Systems Engineering, Lehigh University, 2008.

Ph.D. Students, Current

11. Haoran Zhu, expected 2020.

M.S. Students

1. Samuel Schmitt, (2016) Master's Project: *Routing and Scheduling for the Madison USPS*.
2. Hyeongmin Han, (2014); Master's Project: *An Integer Program for Space and Classroom Scheduling*.
3. Gizem Cavuslar, (2013); Master's Project: *Relaxations for a Nonlinear Flow Set*.
4. Chia-Chun Tsai; (2009-2010); Master's Project: *Models for Mitigating Cascading in Power Grids*.
5. Udom Janjarassuk; (2004-2005); Master's Project: *The Stochastic Network Interdiction Problem*.
6. Wasu Glankwamdee; (2003-2004); Master's Thesis: *Lookahead Branching for Mixed Integer Programming*.

Postdoctoral Students

1. Claudia D'Ambrosio, 2010
2. Hongbo Dong, 2011-2012
3. James Foster, 2014-2015

Undergraduate Research

1. Jackie Griffin, 2006, Lehigh University
2. Wesley Collier, 2012, UW-Madison

Ph.D. Thesis Committees

University of Wisconsin-Madison, Department of Industrial and Systems Engineering

1. Mucahit Cevik, current
2. Ashesh Sinha, current
3. Cong Zhao, current
4. Lisa Tang, current
5. Merve Bodur, 2015
6. Mahdi Hamzeei, 2014
7. Sanket Bhat, 2014
8. Yanchao Liu, 2014
9. James Codella, 2014
10. Mehmet Ertem, 2014
11. Yongjia Song, 2013
12. Taher Jamshidi, 2013
13. Sinan Tas, 2012
14. Mehmet Ayvaçi, 2012
15. Uchechukwu Okpara, 2012
16. Fatih Safa Erenay, 2010
17. Naraphorn Haphuriwat, 2010

University of Wisconsin-Madison, Department of Computer Science

18. Cong Han Lim, current
19. Tony Nowatzki, current
20. Nilay Vaish, current
21. Taedong Kim, 2015
22. Emily Blem, 2013

University of Wisconsin-Madison, Department of Chemical and Biological Engineering

23. Andres Merchan, 2015
24. Sara Velez, 2014
25. Chris Tervo, 2014
26. Joonhoon Kim, 2012
27. Carlos Henao, 2012
28. Matthew Colvin, 2010

University of Wisconsin-Madison, Department of Electrical and Computer Engineering

29. Jung Seob Lee, current
30. Daniel Seemuth, 2016
31. Spencer Millican, 2015

32. Min Li, 2014
33. Hamid Shojaei, 2012
34. Tai-Hsuan Wu, 2011
35. Cheng-Han Sung, 2010

University of Wisconsin-Madison, Department of Mathematics

36. Jeff Poskin, current

University of Wisconsin-Madison, Department of Nuclear Engineering

37. Robert Carlson, 2016

University of Wisconsin-Madison, Department of Statistics

38. Jiajie Chen, 2014

Lehigh University, Department of Industrial and Systems Engineering

39. Camilo Mancilla, 2011
40. Scott Denegre, 2011
41. Matthew Galati, 2009
42. Zeliha Acka, 2009
43. Menal Guzelsoy, 2009
44. Ashutosh Mahajan, 2009
45. Hyong-Mo Jeon, 2008
46. Yan Xu, 2007
47. Clara Novoa, 2005
48. Dorid Mustafa, 2005
49. Shangyuan Luo, 2003

Technische Universität Darmstadt

50. Sarah Drewes, 2009

Northwestern University

51. Shane Drew, 2007

F Grants and Contracts

1. "Decomposition and Duality: New Approaches to Integer and Stochastic Integer Programming" AUSTRALIAN RESEARCH COUNCIL, co-Principal Investigator, 1/14-12/16, with A. Eberhard, Royal Melbourne Institute of Technology; Natashia Boland, Newcastle University.

2. "Multifaceted Mathematics Center for Complex Energy Systems" DEPARTMENT OF ENERGY, co-Principal Investigator, $3,500,000 (UW Portion), 9/12–9/17, with M. Anitescu (PI), Emil Constantinescu, Sven Leyffer, Paul Hovland, Todd Munson, Barry Smith, and Victor Zavala, Argonne National Lab; Christopher DeMarco, Michael Ferris, Bernard Lesieutre, James Luedtke, and Stephen Wright, University of Wisconsin-Madison; Barry Lee, Guang Lin, Mahantesh Halappanavar, Zhenyu Huang, and Alexandre Tartakovsky, Pacific Northwest National Laboratory; John Birge and Jonathan Weare, The University of Chicago, and Jean-Paul Watson, Sandia National Laboratories.

3. "Using a Virtual Engineering Internship to Model the Complexity of Engineering Design Problems," NATIONAL SCIENCE FOUNDATION (EEC-1232656), Co-Principal Investigator, $549,999, 9/12–8/15, with D.W. Shaffer (PI) and N. C. Chesler, University of Wisconsin-Madison.

4. "Efficient Solution Methods for Large-Scale Stochastic MINLP," EXXONMOBIL UPSTREAM RESEARCH COMPANY, Principal Investigator, $508,418, 1/12–12/16, with J. Luedtke, and S. Wright, University of Wisconsin-Madison.

5. "MINOTAUR: A New Toolkit for Solving Mixed-Integer Nonlinear Optimization Problems," DEPARTMENT OF ENERGY, subcontract from Argonne National Lab, $176,000, 1/12–12/12, with J. Luedtke, University of Wisconsin-Madison.

6. "Large Scale Stochastic MINLP," EXXONMOBIL UPSTREAM RESEARCH COMPANY, Principal Investigator, $58,857, 12/10–12/11, with M. Ferris, J. Luedtke, and S. Wright, University of Wisconsin-Madison.

7. "Reconfiguring Power Systems to Minimize Cascading Failures: Models and Algorithms," DEPARTMENT OF ENERGY, (DE-SC0002283), Co-Principal Investigator, $1,053,904 (UW portion), 8/09—8/13, with I. Dobson and S. Wright (PI), University of Wisconsin-Madison, I. Hiskens, University of Michigan, and D. Bienstock, Columbia University.

8. "Next Generation Solvers for Mixed Integer Nonlinear Programs: Structure, Search, and Implementation," DEPARTMENT OF ENERGY, (DE-FG02-08ER25861), Principal Investigator, $528,476 (UW portion), 8/08—8/11, with J. Luedtke, University of Wisconsin-Madison, Sven Leyffer and Todd Munson, Argonne National Lab, and Andrew Miller, Université Bordeaux 1.

9. "Collaborative Research: Next Generation Solvers for Mixed Integer Nonlinear Programs: Structure, Search, and Implementation," NATIONAL SCIENCE FOUNDATION (CCF-0830153), Principal Investigator, $199,997 (UW portion), 8/08—8/12, with J. Luedtke, University of Wisconsin-Madison, Sven Leyffer and Todd Munson, Argonne National Lab, and Andrew Miller Université Bordeaux 1.

10. "Optimization Under Nonconvexity and Uncertainty: Algorithms and Software," DEPARTMENT OF ENERGY (DE-FG02-05ER25694) and (DE-FG02-09ER25869), Principal Investigator, $230,637, 8/05—11/10.

11. "Short Courses in Support of Technology for Process Planning," PENNSYLVANIA INFRASTRUCTURE TECHNOLOGY ALLIANCE (PITA X), Principal Investigator, $36,000, 11/06—6/08.

12. "Unrestricted Research Grant," AIR PRODUCTS & CHEMICALS, Principal Investigator, $60,500, 7/05—4/07

13. "IBM Faculty Partnership Grant," INTERNATIONAL BUSINESS MACHINES, Principal Investigator, $20,000, 2006.

14. "Research on Large Scale Optimization," AIR PRODUCTS & CHEMICALS, Principal Investigator, $25,000, 2006.

15. "Short Courses in Support of Technology for Process Planning," PENNSYLVANIA INFRASTRUCTURE TECHNOLOGY ALLIANCE (PITA IX), Principal Investigator, $17,219, 11/05—3/07.

16. "Advanced Computational Techniques for Optimization," SAS INSTITUTE, INC., Co-Principal Investigator, $105,000, 8/05—8/06, with T. Ralphs, Lehigh University.

17. "Exploiting Cyberinfrastructure to Solve Real-Time Integer Programs," NATIONAL SCIENCE FOUNDATION (CMMI-0522796), Principal Investigator, $249,161 (Lehigh portion), 9/05—9/08, with T. Ralphs, Lehigh University, S. Ahmed, G. Nemhauser, and M. Savelsbergh, Georgia Institute of Technology, and A. Miller and M. Ferris, University of Wisconsin-Madison.

18. "CIEG Supplement: Exploiting Cyberinfrastructure to Solve Real-Time Integer Programs," NATIONAL SCIENCE FOUNDATION (CMMI-0715062), Principal Investigator, $11,750, 3/07.

19. "Computational Models and Algorithms for Enterprise-wide Optimization of Process Industries," PENNSYLVANIA INFRASTRUCTURE TECHNOLOGY ALLIANCE (PITA VIII), Principal Investigator, $78,588 (Lehigh portion), 4/05—4/06, joint with I. Grossmann, L. Biegler, J. Hooker, Carnegie-Mellon University, and A. Schaefer, University of Pittsburgh.

20. "Unrestricted Research Grant," AIR PRODUCTS & CHEMICALS, Principal Investigator, $27,500, 7/05—7/06.

21. "Take or Pay Valuation," AIR PRODUCTS & CHEMICALS and THE BOC GROUP, Principal Investigator, $22,500, 3/05—3/06.

22. "MW: Master-Worker Middleware for Grids," NATIONAL SCIENCE FOUNDATION (OCI-0330607), Principal Investigator, $209,700 (Lehigh portion), 9/03—9/07, with S. Wright and M. Livny, University of Wisconsin-Madison.

23. "A GAMS Interface to IPOPT for Large-Scale Nonlinear Programming," AIR PRODUCTS & CHEMICALS and PENNSYLVANIA INFRASTRUCTURE TECHNOLOGY ALLIANCE (PITA VIII), $1100, 6/04–9/05, with L. Biegler, Carnegie Mellon University.

24. "Enterprise-Wide Optimization," AIR PRODUCTS & CHEMICALS and PENNSYLVANIA INFRASTRUCTURE TECHNOLOGY ALLIANCE (PITA VII), Co-Principal Investigator, $50,000, 1/03—1/04, with R. Berger, E. Perevalov, T. Ralphs, and A. Ross, Lehigh University.

Equipment Grants

25. "Optimization on a Computational Grid," ALLIANCE ALLOCATIONS BOARD, (DDM050005), Principal Investigator, 126,000 CPU Hours (2007), 200,000 CPU Hours (3/06), 250,000 CPU Hours (3/05).

26. "Numerical Optimization on the TeraGrid," PARTNERSHIPS FOR ADVANCED COMPUTATIONAL INFRASTRUCTURE (PACI) (TG-DDM040003), Principal Investigator, 30,000 CPU Hours, (2/04).

27. "High Performance Computing for Numerical Optimization," PARTNERSHIPS FOR ADVANCED COMPUTATIONAL INFRASTRUCTURE (PACI) (DDM040004), Principal Investigator, 11,000 CPU Hours (1/04).

28. "Grid Computing for Optimization,"NATIONAL RESOURCE ALLOCATIONS COMMITTEE (NRAC) (MCA00N015N), Collaborator, 310,000 CPU Hours, (3/00), with M. Ferris, University of Wisconsin-Madison.

G Teaching

University of Wisconsin-Madison

Course	**Date**	**Enrollment**	**Eval** (Max 5.0)
ISyE323—Operations Research - Deterministic Modeling	S16	43	4.9
ISyE323—Operations Research - Deterministic Modeling	F15	40	4.6
ISyE601—Tools and Environments for Optimization	F15	18	4.7
ISyE719—Stochastic Programming	S14	25	4.3
ISyE323—Operations Research - Deterministic Modeling	F13	54	4.7
ISyE635—Tools and Environments for Optimization	S13	54	4.7
ISyE323—Operations Research - Deterministic Modeling	S13	33	4.6
ISyE513—Analysis of Capital Investments	F12	53	3.9
ISyE635—Tools and Environments for Optimization	S12	54	4.6
ISyE323—Operations Research - Deterministic Modeling	S12	33	4.6
ISyE719—Stochastic Programming	F11	32	4.4
ISyE323—Operations Research - Deterministic Modeling	S11	25	4.6
ISyE635—Tools and Environments for Optimization	S11	50	4.7
ISyE323—Operations Research - Deterministic Modeling	F10	75	4.6
ISyE635—Tools and Environments for Optimization	S10	53	4.6
ISyE719—Stochastic Programming	S10	24	4.5
ISyE323—Operations Research - Deterministic Modeling	F09	71	4.7
ISyE320—Simulation and Probabilistic Modeling	S09	40	4.5
ISyE323—Operations Research - Deterministic Modeling	F08	78	3.9
ISyE635—Tools and Environments for Optimization	S08	27	4.3
ISyE323—Operations Research - Deterministic Modeling	F07	53	3.3

Lehigh University

Course	**Date**	**Enrollment**	**Eval** (Max 5.0)
IE170—Algorithms in Systems Engineering	S07	12	4.9
IE171—Algorithms in Systems Engineering Laboratory	S07	12	4.4
IE426—Optimization Models and Applications	F06	28	4.5
IE417—Nonlinear Programming	S06	15	4.2
IE426—Optimization Models and Applications	F05	18	4.5
IE418—Integer Programming	S05	13	4.4
ENG5—Introduction to Engineering Practice	F04	24	-
ISE185—ISELP Honors Seminar	F04	8	-
IE418—Integer Programming	F03	12	4.9
IE316—Optimization Models and Applications	F03	49	4.4
IE495—Stochastic Programming	S03	16	4.8
IE398—Applications of Operations Research	F02	16	4.8

External Short Courses

- "Computational Stochastic Programming," 13^{th} Conference on Stochastic Programming (SP XIII), Bergamo, Italy, July, 2013.
- "Grid Computing for Optimization: Modeling and Solution," (with Michael Ferris and Stephen Wright, University of Wisconsin-Madison), Second International Conference on Continuous Optimization (ICCOPT-II), McMaster University, Hamilton, Ontario, Canada, August, 2007.
- "A Practical Guide to Mixed Integer Nonlinear Programming," (with Sven Leyffer, Argonne National Lab), SIAM Conference on Optimization, Stockholm, May 2005.
- "Numerical Optimization for Large Scale Systems," Winter School on High Performance and Grid Computing, Università della Calabria, Rende, Italy, March, 2005.

- "Experimental Algorithmics, with a Focus on Branch and Bound for Discrete Optimization Problems," (with Cindy Phillips, Sandia National Lab), DIMACS Reconnect Satellite Conference, Lafayette College, Easton, PA, June 2004.

H Professional Service

University Service - College Committees, UW-Madison

Dates	Role	Committee
2015-2016	Member	Computational Infrastructure Committee
2015-2016	Member	Hiring Committee, Grainger Institute
2013-2014	Chair	Computational Infrastructure Committee
2013	Member	Bollinger Academic Staff Award Committee
2011-Present	Member	CAE Executive Committee
2011-2012	Member	ISyE Research Center Stakeholder Committee
2010	Member	Byron Bird Award for Research Publication Excellence
2010	Member	Hiring Committee, Computer Aided Engineering

University Service - Campus Committees

Dates	Role	Committee
2015-2016	Member	Committee on Committees
2013-2014	Chair	Physical Sciences Divisional Committee
2013-2014	Member	Committee on Space Planning
2012-2013	Vice Chair	Physical Sciences Divisional Committee
2011-2015	Member	Hiring Committee, Wisconsin Institutes for Discovery
2011-2012	Member	Physical Sciences Divisional Committee
2011-2012	Member	High Performance Computing Task Force
2012	Member	Hilldale Award Subcommittee
2011	Member	Campus Planning Committee
2010	Member	Hiring Committee, Wisconsin Institutes for Discovery
2008-2012	Member	University Information Technology Committee
2007-2010	Alternate	Faculty Senate

Other University Service

- Chair, Review Committee, UW Business Certificate program, 2016.
- Mentor, Sloan Engineering Mentoring Program, 2009

External Service

Editorships

- co-Editor, *Optima*, Mathematical Optimization Society Newsletter, 2014-present.
- Guest Editor, *Mathematical Programming, Series B*, Special Issue on "Integer Programming Under Uncertainty," with Shabbir Ahmed, 2014.
- Associate Editor, *Operations Research*, 2012-2016.
- Area Editor, Stochastic, Robust, and Global Optimization, *Mathematical Programming Computation*, 2008-present.
- Associate Editor, *Computational Optimization and Applications*, 2007-2016.
- Associate Editor, *INFORMS Journal on Computing*, 2003-present.

- Editorial Board, *Optimization Methods and Software*, 2008-2012.
- Associate Editor, *Asia-Pacific Journal of Operational Research*, 2007-2010.
- Topical Editor, Integer Programming, *Wiley Encyclopedia of Operations Research and Management Science*, 2008-2011.
- Topical Editor, Optimization Software, *Wiley Encyclopedia of Operations Research and Management Science*, 2008-2011.
- Guest Editor, *Parallel Computing*, Special Issue on "Optimization on Grids—Optimization for Grids," with Roberto Musmanno, 2006.

Leadership Positions in Professional Socities

- Board of Directors, INFORMS Computing Society, 2013-2015.
- Council Member-at-large, Mathematical Optimization Society, 2009-2012.
- Secretary, Committee on Stochastic Programming (COSP), 2010-2013.
- Member, INFORMS Membership and Member Services Committee, 2012.
- Council Member, Committee on Stochastic Programming (COSP), 2007-2010.
- Newsletter Editor, INFORMS Computing Society, 2008-2010.
- Secretary-Treasurer, INFORMS Computing Society, 2006-2008.

Prize Committees

- Member, Prize Committee, Nicholsen Prize, 2015-2016.
- Chair, Prize Committee, INFORMS JFIG Paper Competition, 2012.
- Member, Prize Committee, ICS Prize, 2010, 2015-2017.
- Member, Prize Committee, Beale-Orchard-Hayes Prize, 2009
- Member, Prize Committee, INFORMS Computing Society Student Paper Competition, 2007

Conference Organization

- General Program Co-Chair, INFORMS Annual Meeting, Philadelphia, 2015.
- Cluster Chair, Mixed Integer Nonlinear Programming, ISMP 2015.
- Interactive Sessions co-Chair, INFORMS Annual Meeting, Minneapolis, 2013.
- Local Organizing Committee, MIP 2013 Workshop, Madison, WI, 2013.
- Stream Chair, Mixed Integer Nonlinear Programming, INFORMS Computing Society Conference, Sante Fe, New Mexico, 2013.
- Organizing Committee, INFORMS Meeting for the Midwest Region, Columbus, Ohio, 2011.
- Local Organizing Committee, 20th International Symposium on Mathematical Programming, Chicago, 2009.
- Local Organizing Committee, MIP 2008 Workshop, New York, 2008.
- Organizing Committee, MIP 2006 Workshop, Miami, 2006.
- Organizing Committee, DIMACS Workshop on COIN-OR, Piscataway, NJ, 2006.
- Organizing Committee, Institute for Mathematics and Its Applications "Hot Topics" Workshop on Integer Programming, 2005.

Conference Program Committees

- 12th International Conference on Integration of Artificial Intelligence and Operations Research (CPAIOR), Barcelona, 2015.
- MIP 2015 Workshop, Chicago.
- INFORMS Optimization Society Society Conference, Houston, 2014.
- IPCO 2014: The Seventeenth Conference on Integer Programming and Combinatorial Optimization, Bonn, 2014.

- Workshop on Scalable Parallel and Distributed Optimization (SPDO), 2012
- 9th International Conference on Integration of Artificial Intelligence and Operations Research (CPAIOR), Nantes, 2012.
- INFORMS Optimization Society Society Conference, Miami, 2012.
- 8th International Conference on Integration of Artificial Intelligence and Operations Research (CPAIOR), Berlin, 2011.
- Parallel Optimization in Emerging Computing Environments (POECE) 2010, Hammamet, Tunisia, 2010.
- TOGO Global Optimization Workshop, Toulouse, 2010.
- IEEE International Parallel & Distributed Processing Symposium (IPDPS), Algorithms Track, 2008.
- Parallel and Grid Computing for Optimization (PGCO), 2007.
- Sixth International Conference on Parallel Processing and Applied Mathematics, 2005.

Journal Review

- *4OR*,
- *Algorithmica*,
- *Annals of Operations Research*,
- *Computational Management Science*,
- *Computational Optimization and Applications*,
- *Concurrent Engineering: Research & Applications*,
- *Constraints*,
- *Discrete Applied Mathematics*,
- *Discrete Optimization*,
- *Global Optimization*,
- *IEEE Transactions on Parallel and Distributed Systems*,
- *IET Generation, Transmission & Distribution*,
- *International Journal of Systems Science*,
- *INFORMS Journal on Computing*,
- *Mathematics of Computation*,
- *Mathematical Methods of Operations Research*,
- *Mathematical Programming*,
- *Mathematical Programming Computation*,
- *Management Science*,
- *Optimization Methods and Software*,
- *Operations Research*,
- *Operations Research Letters*,
- *Parallel Computing*,
- *SIAM Journal on Optimization*,
- *Transportation Science*,

Professional

- Opponent for conferring of doctoral degree to Mathias Stolpe, *Models and Methods for Structural Topolgy Optimization with Discrete Design Variables*, Department of Wind Energy, Technical University of Denmark, 2013.

Conference Review

Reviewed articles for the following conferences, but did not serve on the program committees.

- IPCO 2011: The Fifteenth Conference on Integer Programming and Combinatorial Optimization, 2011
- IPCO 2010: The Fourteenth Conference on Integer Programming and Combinatorial Optimization, 2010
- Euro-Par 2010
- INFORMS Computing Society Conference, 2007
- International Conference on Complementarity Problems, 1999

Proposal Review

- Natural Sciences and Engineering Research Council of Canada (NSERC)
- Austrian Science Fund (FWF)
- Chilean Research Fund Council
- Nebraska Experimental Program to Stimulate Competitive Research (EPSCoR)
- U.S. Civilian Research and Development Foundation
- U.S. Department of Energy (Multiple panels and ad-hoc reviews)
- U.S. National Science Foundation (Multiple panels)

Other Service Activities

- Member, 2018 Symposium Advisory Committee, Mathematical Optimization Society.
- Chairman, 2015 Symposium Advisory Committee, Mathematical Optimization Society.
- Panelist, INFORMS Future Academician Colloquium, 2009.
- Area Coordinator—Integer Programming, *Optimization Online*, 2000-present.
- Area Coordinator—Applications, OR, and Management Science, *Optimization Online*, 2000-present.
- Area Coordinator—Stochastic Programming, *Optimization Online*, 2003-present.
- Area Coordinator—Robust Optimization, *Optimization Online*, 2003-present.
- Member, Technical Leadership Council: Computation Infrastructure for Operations Research (COIN-OR) Foundation, 2004-2005.
- Administrator, *Network Enabled Optimization System* (NEOS), 1998-present.

I Consulting

- Air Products & Chemicals, 2004-2006
- Axioma, 2003-2006
- Barclay's Bank 2006-2007
- BOC Gases, 2005
- Dow Chemicals, 2008
- IBM, 2014-2015
- ILOG, 2006
- Portland Gas & Electric, 2008-2010
- Ziena, 2005-2007