Dr. Jean-Paul Watson

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Education

2003 Ph.D., Computer Science, Colorado State University, Fort Collins, Colorado GPA 4.0/4.0
1999 M.S., Computer Science, Colorado State University, Fort Collins, Colorado GPA 4.0/4.0
1992 B.S., Computer Science, New Mexico State University, Las Cruces, New Mexico GPA 3.9/4.0

Research Areas

Heuristic and Metaheuristic Search, Robust Optimization, Stochastic Programming, Integer Programming,
Visual Analytics and Decision Support, Optimization for Simulation, Scheduling, Logistics,
Empirical Evaluation and Analysis of Algorithms

Professional Experience

October 2008-Present: Principal Member of Technical Staff *Sandia National Laboratories, Albuquerque, NM*
Design, implement, and analyze optimization and informatics algorithms for energy, defense, and non-proliferation applications. Lead and participate in project teams in these areas, emphasizing uncertainty management and large-scale computational aspects.

August 2003-October 2008: Senior Member of Technical Staff *Sandia National Laboratories, Albuquerque, NM*
Design, implement, and analyze optimization algorithms for a variety of defense and homeland security applications. Technical lead for multi-year project to optimize the spare parts supply/repair logistics chains for the Lockheed Martin Joint Strike Fighter and the US Army Future Combat System. Technical lead for a visual analytics project involving the synthesis of optimization, pattern recognition, and visualization to support advanced decision-making. Deploy multi-objective, heuristic algorithms to place contamination sensors in municipal water networks for the US Environmental Protection Agency. Research the fundamental behavioral dynamics of metaheuristic algorithms for optimization.

September 2000-July 2003: Research Assistant *Colorado State University, Fort Collins, CO*
Developed and analyzed algorithms for solving a U.S. Air Force satellite scheduling problem. Designed and implemented software for visualization, interactive manipulation, and re-optimization of schedules.

August 2002-December 2002: Instructor *Colorado State University, Fort Collins, CO*
Instructor for an introductory course on discrete mathematics. Prepared and delivered lectures to a class of 46 students. Developed course syllabus, homework assignments, quizzes, and exams.

January 1998-August 2000: Research Assistant *Colorado State University, Fort Collins, CO*
Analyzed the impact of problem structure on algorithm performance for a variety of synthetic and real-world scheduling problems. Quantified differences between the search spaces of random and structured problem instances, and showed that these differences can significantly impact algorithm behavior.

August 1997-December 1997: Teaching Assistant *Colorado State University, Fort Collins, CO*
Teaching assistant for an introductory course on data structures and algorithms, taught using C++. Graded homeworks, quizzes, and exams. Taught recitations and assisted students with programming assignments.

May 1994-July 1997: Software Engineer *Hughes Aircraft, Aurora, CO*
Led a team of 10 software engineers in the specification, design, implementation, and preliminary testing of a software subsystem that was part of a larger classified project for the U.S. government. Key member of a proposal team that won a $25 million contract for follow-on research and development.

June 1992-April 1994: Software Engineer *International Business Machines, Austin, TX*

   Designed and implemented software for analyzing the performance of VLSI microprocessor physical design layouts. Interfaced with several hardware design teams to validate the software, resolve performance and usability problems, and implement project-specific requirements.

Publications

Theses:

Empirical Modeling and Analysis of Local Search Algorithms for the Job-Shop Scheduling Problem, Doctor of Philosophy, Department of Computer Science, Colorado State University, Fort Collins, Colorado. 2003.

The Impact of Approximate Evaluation on the Performance of Search Algorithms for Warehouse Scheduling, Master of Science, Department of Computer Science, Colorado State University, Fort Collins, Colorado. 1999.

Journal Articles Under Review or Revision:

1. H.J. Greenberg, J.P. Watson, and D.L. Woodruff. Parametric Stochastic Programming with a Chance Constraint. *Operations Research*.

2. R. Jiang, Y. Guan, and J.P. Watson. Cutting Planes for the Multi-Stage Stochastic Unit Commitment Problem. *Operations Research*.

3. G.C. Lee, M. Hohenrider, J.P. Watson, and D.L. Woodruff. Chance and Service Level Constraints for Stochastic Generation Expansion Planning. *Electric Power Systems Research*.

4. F.B. Veliz, J.P. Watson, A.Weintraub, R.J.B. Wets, and D.L. Woodruff. Stochastic Optimization in Forest Planning: A Progressive Hedging Approach. *Annals of Operations Research*.

Journal Articles:

1. Q. Wang, J.P. Watson, and Y. Guan (To Appear). Two-Stage Robust Optimization for N-k Contingency-Constrained Unit Commitment. *IEEE Transactions on Power Systems*.

2. C. Zhao, J. Wang, J.P. Watson, and Y. Guan (To Appear). Multi-Stage Robust Unit Commitment Considering Wind and Demand Response Uncertainties. em IEEE Transactions on Power Systems.

3. Z. Friedman, J. Ingalls, J.D. Siirola, and J.P. Watson (To Appear). Block-Oriented Modeling of Superstructure Optimization Problems. *Computers and Chemical Engineering*.

4. J.P. Watson, D.L. Woodruff, and W.E. Hart (2012). PySP: Modeling and Solving Stochastic Programs in Python. *Mathematical Programming Computation*, Vol. 4, No. 2.

5. S.W. Legg, A.J. Benavides-Serrano, J.D. Siirola, J.P. Watson, S.G. Davis, A. Bratteteig, and C.D. Laird (2012). A Stochastic Programming Approach for Gas Detector Placement Using CFD-Based Dispersion Simulations. *Computers and Chemical Engineering*, Vol. 45, pp. 194–201.

6. S. Jin, S.M. Ryan, J.P. Watson, and D.L. Woodruff (2011). Modeling and Solving a Large-Scale Generation Expansion Planning Problem Under Uncertainty. *Energy Systems*, Vol. 2, No. 3–4, pp. 209–242.

7. W.E. Hart, J.P. Watson, and D.L. Woodruff (2011). Pyomo: Modeling and Solving Mathematical Programs in Python. *Mathematical Programming Computation*, Vol. 3, No. 3.

8. J.C. Beck, T.K. Feng, and J.P. Watson (2011). A Hybrid Constraint Programming / Local Search Approach to the Job-Shop Scheduling Problem. *INFORMS Journal on Computing*, Vol. 23, No. 1, pp. 1–14.

9. J.P. Watson and D.L. Woodruff (2011). Progressive Hedging Innovations for a Class of Stochastic Mixed-Integer Resource Allocation Problems. *Computational Management Science*, Vol. 8, No. 4, pp. 355–370. **Awarded Best Paper of Computational Management Science 2011.**

10. S. Martin and J.P. Watson (2011). Non-Manifold Surface Reconstruction from High Dimensional Point Cloud Data. *Computational Geometry: Theory and Applications*, Vol. 44, pp. 427–441.

11. J.P. Watson, R.J.B. Wets, and D.L. Woodruff (2010). Scalable Heuristics for a Class of Chance Constrained Stochastic Programs. *INFORMS Journal on Computing*, Vol. 22, No. 4, pp. 543–554.

12. S. Martin, A. Thompson, E.A. Coutsias, and J.P. Watson (2010). Topology of Cyclo-Octane Energy Landscape. *Journal of Chemical Physics*, Vol. 132, No. 23.

13. J.P. Watson, R. Murray and W.E. Hart (2009). Formulation and Optimization of Robust Sensor Placement Problems for Drinking Water Contamination Warning Systems. *Journal of Infrastructure Systems*, Vol. 15, No. 5, pp. 330-339.

14. J. Berry, R.D. Carr, W.E. Hart, V.J. Leung, C.A. Phillips, and J.P. Watson (2009). Designing Contamination Warning Systems for Municipal Water Networks Using Imperfect Sensors. *Journal of Water Resources Planning and Management*, Vol. 135, No. 4.

15. R. Murray, W.E.Hart, J.P. Watson, et al. (2009). The US Environmental Protection Agency uses Operations Research to Reduce Drinking Water Contamination Risks. *INFORMS Interfaces*, Vol. 39, No. 1, pp. 67–68.

16. W.M. Brown, S. Martin, S.N. Pollock, E.A. Coutsias, and J.P. Watson (2008). Algorithmic Dimensionality Reduction for Molecular Structure Analysis. *Journal of Chemical Physics*, Vol. 129, No. 6.

17. A. Ostfeld, ..., J.P. Watson, et al (2008). The Battle of the Water Sensor Networks (BWSN): A Design Challenge for Engineers and Algorithms. *Journal of Water Resources Planning and Management*, Vol. 134, No. 6, pp 556–568.

18. J. Berry, W.E. Hart, C.A. Phillips, J.G. Uber, and J.P. Watson (2006). Sensor Placement in Municipal Water Networks with Temporal Integer Programming. *Journal of Water Resources Planning and Management*, Vol. 132, No. 4, pp. 218–224.

19. J.P. Watson, A.E. Howe and L.D. Whitley (2006). Deconstructing Nowicki and Smutnicki's i-TSAB Tabu Search Algorithm for the Job-Shop Scheduling Problem. *Computers and Operations Research, Anniversary Focused Issue on Tabu Search*, Vol. 33, No. 9, pp. 2623–2644.

20. J.P. Watson, L.D. Whitley and A.E. Howe (2005). Linking Search Space Structure, Run-Time Dynamics, and Problem Difficulty: A Step Toward Demystifying Tabu Search. *Journal of Artificial Intelligence Research*, Vol. 24, pp. 221–261.

21. J. Berry, L. Fleischer, W.E. Hart, C. Phillips, and J.P. Watson (2005). Sensor Placement in Municipal Water Networks. *Journal of Water Resources Planning and Management*, Vol. 131, No. 3.

22. J. Rowe, L.D. Whitley, L. Barbulescu, and J.P. Watson (2004). Properties of Gray and Binary Representations. *Evolutionary Computation*, Vol. 12, No. 1, Spring 2004, pp. 47–76.

23. L. Barbulescu, J.P. Watson, L.D. Whitley, and A.E. Howe (2004). Scheduling Space-Ground Communications for the U.S. Air Force Satellite Control Network. *Journal of Scheduling*, Vol. 7, No. 1, pp. 7–34.

24. J.P. Watson, J.C. Beck, A.E. Howe, and L.D. Whitley (2003). Problem Difficulty for Tabu Search in Job-Shop Scheduling. *Artificial Intelligence*, Vol. 143, No. 2, February 2003, pp. 189–217.

25. J.P. Watson, L. Barbulescu, L.D. Whitley, and A.E. Howe (2002). Contrasting Structured and Random Permutation Flow-Shop Scheduling Problems: Search Space Topology and Algorithm Performance. *INFORMS Journal on Computing*, Vol. 14, No. 2, Spring 2002, pp. 98–123.

26. J.P. Watson, S. Rana, L.D. Whitley, and A.E. Howe (1999). The Impact of Approximate Evaluation on the Performance of Search Algorithms for Warehouse Scheduling. *Journal of Scheduling*, Vol. 2, No. 2, pp. 79–98.

Conference Papers:

1. Y. Feng, D. Gade, S.M. Ryan, J.P. Watson, R.J.B. Wets, and D.L. Woodruff (2013). A New Approximation Method for Generating Day-Ahead Load Scenarios. In *Proceedings of the IEEE 2013 IEEE Power and Energy Society General Meeting*.

2. S.M. Ryan, C. Silva-Monroy, J.P. Watson, R.J.B. Wets, and D.L. Woodruff (2013). Toward Scalable, Parallel Progressive Hedging for Stochastic Unit Commitment. In *Proceedings of the IEEE 2013 IEEE Power and Energy Society General Meeting*.

3. A. Greenhall, R. Christie, and J.P. Watson (2012). MinPower: A Power Systems Optimization Toolkit. In *Proceedings of the IEEE 2012 IEEE Power and Energy Society General Meeting*.

4. N. Fan, R. Chen, and J.P. Watson (2012). N-1-1 Contingency-Constrained Optimal Power Flow. In *Proceedings of the IEEE 2012 IEEE Power and Energy Society General Meeting*.

5. N. Fan and J.P. Watson (2012). Solving the Connected Dominating Set Problem and Power Dominating Set Problem by Integer Programming. In *Combinatorial Optimization and Applications: 6th International Conference, COCOA 2012*, Springer LNCS Vol. 7402.

6. S.W. Legg, J.D. Siirola, J.P. Watson, S.G.Davis, A. Bratteteig, and C.D. Laird (2012). A Stochastic Programming Approach for Gas Detector Placement in Process Facilities. In *Proceedings of Foundations of Computer-Aided Process Operations (FOCAPO) 2012*.

7. D.P. Word, J.P. Watson, D.L. Woodruff, and C.D. Laird (2012). A Progressive Hedging Approach for Parameter Estimation of Stochastic Nonlinear Programs. In *Proceedings of the 11th International Symposium on Process Systems Engineering (PSE 2012)*.

8. J.D. Siirola and J.P. Watson (2012). Modeling and Optimization of Superstructure-based Stochastic Programs for Risk-aware Decision Support. In *Proceedings of the 11th International Symposium on Process Systems Engineering (PSE 2012)*.

9. D.P. Word, J.P. Watson, D.L. Woodruff, and C.D. Laird (2012). A Progressive Hedging Approach for Parameter Estimation of Stochastic Nonlinear Programs. In *Proceedings of 11th International Symposium on Process Systems Engineering (PSE 2012)*.

10. J.P. Watson and J.C. Beck (2008). A Hybrid Constraint Programming / Local Search Approach to the Job-Shop Scheduling Problem. In *Proceedings of the 5th International Conference on the Integration of AI and OR Techniques in Constraint Programming for Combinatorial Optimization (CPAIOR 2008), Springer LNCS Vol. 5015*.

11. W.E. Hart, J.W. Berry, E. Boman, C.A. Phillips, L.A. Risen, and J.P. Watson (2008). Limited-Memory Techniques for Sensor Placement in Water Distribution Networks. In *Proceedings of the Second International Conference on Learning and Intelligent Optimization (LION 2007), Springer LNCS Vol. 5313*.

12. J.P. Watson. On Metaheuristic "Failure Modes": A Case Study in Tabu Search for Job-Shop Scheduling. In *Proceedings of the Sixth Metaheuristics International Conference (MIC-2005)*.

13. C. Bierwirth, D.C. Mattfeld and J.P. Watson. Landscape Regularity and Random Walks for the Job-Shop Scheduling Problem. In *Proceedings of the 4th European Conference on Evolutionary Computation in Combinatorial Optimization (EVOCOP-2004)*, Springer-Verlag LNCS 3004, pp. 21–30.

14. J.P. Watson, A.E. Howe, and L.D. Whitley. An Analysis of Iterated Local Search for Job-Shop Scheduling. In *Proceedings of the Fifth Metaheuristics International Conference (MIC-2003)*.

15. J.C. Beck and J.P. Watson. Adaptive Search Algorithms and Fitness-Distance Correlation. In *Proceedings of the Fifth Metaheuristics International Conference (MIC-2003)*.

16. J.P. Watson, L.D. Whitley, and A.E. Howe. A Dynamic Model of Tabu Search for the Job-Shop Scheduling Problem. In *Proceedings of the First Multidisciplinary International Conference on Scheduling: Theory and Applications (MISTA-2003)*. Winner of the Best Paper Award. Extended version appears in G. Kendall, E. Burke, S. Petrovic, and M. Gendreau (eds) (2005), *Multidisciplinary Scheduling – Theory and Applications*, Springer, New York.

17. L.D. Whitley, D. Garrett, and J.P. Watson (2003). Quad Search and Hybrid Genetic Algorithms. In *Proceedings of the Genetic and Evolutionary Computation Conference (GECCO-2003)*, Springer-Verlag LNCS 2724, pp. 1469–1480.

18. L. Barbulescu, A.E. Howe, J.P. Watson, and L.D. Whitley (2002). Satellite Range Scheduling: A Comparison of Genetic, Heuristic and Local Search. In *Proceedings of the Seventh International Conference on Parallel Problem-Solving From Nature (PPSN-VII)*, Springer-Verlag LNCS 2439, pp. 611–620.

19. J.P. Watson, J.C. Beck, A.E. Howe, and L.D. Whitley (2001). Toward an Understanding of Local Search in Job-Shop Scheduling. In *Proceedings of the Sixth European Conference on Planning (ECP-01).*. Winner of the PLANET Prize for Research Excellence. To appear in a forthcoming Springer-Verlag LNAI volume.

20. L. Barbulescu, J.P. Watson, and L.D. Whitley (2000). Dynamic Representations and Escaping Local Optima: Improving Genetic Algorithms and Local Search. In *Proceedings of the Seventeenth National Conference on Artificial Intelligence (AAAI-2000)*, Morgan Kaufmann/AAAI Press, pp. 879–884.

21. L.D. Whitley, L. Barbulescu, and J.P. Watson (2000). Local Search and High-Precision Gray Codes: Convergence Results and Neighborhoods. In *Proceedings of the Sixth Workshop on the Foundations of Genetic Algorithms (FOGA-6)*, Morgan Kaufmann, pp. 295–311.

22. J.P. Watson, L. Barbulescu, A.E. Howe, and L.D. Whitley (1999). Algorithm Performance and Problem Structure for Flow-Shop Scheduling. In *Proceedings of the Sixteenth National Conference on Artificial Intelligence (AAAI-99)*, Morgan Kaufmann/AAAI Press, pp. 688–695.

23. J.P. Watson (1999). A Performance Assessment of Modern Niching Methods for Parameter Optimization Problems. In *Proceedings of the Genetic and Evolutionary Computation Conference (GECCO-1999)*, Morgan Kaufmann, pp. 702–709.

24. L.D. Whitley, A.E. Howe, S. Rana, J.P. Watson, and L. Barbulescu (1998). Comparing Heuristic Search Methods and Genetic Algorithms for Warehouse Scheduling. In *Proceedings of the IEEE International Conference on Systems, Man, and Cybernetics (SMC-98)*, IEEE Press, pp. 2430–2435.

25. J.P. Watson, C. Ross, V. Eisele, J. Denton, J. Bins, C. Guerra, L.D. Whitley, and A.E. Howe (1998). The Traveling Salesrep Problem, Edge Assembly Crossover, and 2-opt. In *Proceedings of the Fifth International Conference on Parallel Problem-Solving From Nature (PPSN-V)*, Springer-Verlag LNCS 1498, pp. 823–832.

Books:

1. W.E. Hart, C.D. Laird, J.P. Watson, and D.L. Woodruff (2012). Pyomo: Optimization Modeling in Python. Springer, Optimization and its Applications Series, Vol. 67. 237 pages.

Edited Books:

1. N. Krasnogor, A. Auger, ..., J.P. Watson, ..., and T. Yu (2011). Proceedings of the Genetic and Evolutionary Computation Conference (GECCO) 2005.

2. V. Maniezzo, R. Battiti, and J.P. Watson (2008). Learning and Intelligent Optimization, Proceedings of the Second International Conference (LION 2007). Springer LNCS Volume 5313.

3. H.G. Beyer, U.M. O'Reily, D.V. Arnold, W. Banzhaf, ..., J.P. Watson, and E. Zitzler (2005). Proceedings of the Genetic and Evolutionary Computation Conference (GECCO) 2005.

Book Chapters:

1. J.P. Watson (To Appear). An Introduction to Fitness Landscape Analysis and Cost Models for Local Search. In *Handbook of Metaheuristics, 2nd ed. Eds: M. Gendreau and J.Y. Potvin. Springer.*

2. L.D. Whitley and J.P. Watson (2005). Complexity Theory and the No-Free Lunch Theorem. In *Introductory Tutorials in Optimisation, Search and Decision Support Methodologies (INTROS-03). Eds: E.K. Burke and G. Kendall. Springer.*

Invited Papers:

1. L.D. Whitley, J.P. Watson, A.E. Howe, and L. Barbulescu (2002). Testing, Evaluation and Performance of Optimization and Learning Systems. In *Adaptive Computing in Design and Manufacture V*, Springer-Verlag, pp. 27–39.

2. L. Barbulescu, J.P. Watson, L.D. Whitley, and A.E. Howe (1999). Problem Structure and Flowshop Scheduling. In *Proceedings of the Sixteenth Congreso de Ecuaciones Diferenciales y Aplicaciones (CEDYA-99)*, pp. 27–38.

Technical Reports:

1. W.E. Hart, R.D. Carr, C.A. Phillips, J.P. Watson, N.L. Benavides, H. Greenberg, and T. Morrison. LDRD Final Report: Robust Analysis of Large-Scale Combinatorial Applications, No. SAND2007-5983.

2. E.E. May, A.M. Johnston, J.P. Watson, W.M. Brown, and M.D. Rintoul (2005). Deciphering the Genetic Regulatory Code Using an Inverse Error Control Coding Framework, No. SAND2005-1029.

3. E.E. May, A.M. Johnston, W.E. Hart, J.P. Watson, R.J. Pryor, and M.D. Rintoul (2003). Detection and Reconstruction of Error Control Codes for Engineered and Biological Regulatory Systems. Sandia National Labs Technical Report, No. SAND2003-3963.

Workshop Papers:

1. J.P. Watson, W.E. Hart, and M. Regan (2006). Formulation and Optimization of Robust Sensor Placement Problems for Contaminant Warning Systems. In *Proceedings of the 8th Annual Water Distribution Systems Analysis Symposium (WDSA-2006).*

2. J. Berry, R.D. Carr, W.E. Hart, V.J. Leung, C.A. Phillips, and J.P. Watson. ON the Placement of Imperfect Sensors in Municipal Water Networks. In *Proceedings of the 8th Annual Water Distribution Systems Analysis Symposium (WDSA-2006).*

3. J.P. Watson, W.E. Hart, and J.W. Berry (2005). Scalable High-Performance Heuristics for Sensor Placement in Water Distribution Networks. In *Proceedings of the 2005 World Water and Environmental Resources Congress (EWRI-2005).*

4. J.W. Berry, W.E. Hart, C.A. Phillips, and J.P. Watson (2004). Scalability of Integer Programming Computations for Sensor Placement in Water Networks. In *Proceedings of the 2004 World Water and Environmental Resources Congress (EWRI-2004).*

5. J.W. Berry, W.E. Hart, C.A. Phillips, J.G. Uber, and J.P. Watson (2005). Validation and Assessment of Integer Programming Sensor Placement Models. In *Proceedings of the 2004 World Water and Environmental Resources Congress (EWRI-2004).*

6. J.P. Watson, H.J. Greenberg, and W.E. Hart (2004). A Multiple-Objective Analysis of Sensor Placement Optimization in Water Networks. In *Proceedings of the 2004 World Water and Environmental Resources Congress (EWRI-2004).*

7. J.P. Watson, J.C. Beck, A.E. Howe, and L.D. Whitley (2001). Toward a Descriptive Model of Local Search Cost in Job-Shop Scheduling. *International Joint Conference on Artificial Intelligence (IJCAI-01) Workshop on Stochastic Local Search*.

8. J.P. Watson (2000). Problem Difficulty and Fitness Landscapes of Structured and Random Job-Shop Scheduling Problems: What Do Existing Analysis Techniques Really Tell Us? *European Conference on Artificial Intelligence (ECAI-2000) Workshop on Local Search for Planning and Scheduling*.

9. J.P. Watson and A.E. Howe (2000). Focusing on the Individual: Why We Need New Empirical Methods for Characterizing Problem Difficulty (Position paper). *European Conference on Artificial Intelligence (ECAI-2000) Workshop on Empirical Methods in Artificial Intelligence*.

10. A.E. Howe, L.D. Whitley, L. Barbulescu, and J.P. Watson (2000). Mixed Initiative Scheduling for the Air Force Satellite Control Network. *Second NASA International Workshop on Planning and Scheduling for Space*.

11. A.E. Howe, L.D. Whitley, J.P. Watson, and L. Barbulescu (2000). A Study of Air Force Satellite Access Scheduling. *2000 World Automation Congress (WAC-2000)*.

Professional Presentations

1. *Stochastic Optimization and Energy Applications: Operations Unit Commitment and Generation Expansion Planning.* Arizona State University, Phoenix, AZ. April, 2013.

2. *Stochastic Optimization and Energy Applications: Operations Unit Commitment and Generation Expansion Planning.* National Renewable Energy Laboratory, Golden, CO. March, 2013.

3. *Scalable, Stochastic Unit Commitment for Electricity Grid Reliability Operations.* Naval Postgraduate School, Monterey, CA. February 2013.

4. *Scalable, Parallel Stochastic Unit Commitment for Improved Day-Ahead and Reliability Operations*. INFORMS Computing Society Meeting, Santa Fe, NM. January 2013.

5. *Stochastic Optimization of Power Systems Planning and Operations in High Penetration Renewables Scenarios.* 5th International Conference on Integration of Renewable and Distributed Energy Resources, Berlin, Germany. December 2012.

6. *Scalable, Parallel Stochastic Unit Commitment for Improved Day-Ahead and Reliability Operations*. INFORMS Annual Meeting, Phoenix, AZ. October 2012.

7. *Some Thoughts and Observations on Python, Pyomo, and Performance*. INFORMS Annual Meeting, Phoenix, AZ. October 2012.

8. *Survivability-Constrained Unit Commitment with Post-Contingency Corrective Recourse*. INFORMS Annual Meeting, Phoenix, AZ. October 2012.

9. *Asynchronous Progressive Hedging*. 21st International Symposium on Mathematical Programming (ISMP-2012), Berlin, Germany. August 2012.

10. *Scalable, Parallel Stochastic Unit Commitment for Improved Day-Ahead and Reliability Operations*. Federal Energy Regulatory Commission Technical Workshop on Increasing Efficiency through Improved Software, Washington, DC. June, 2012.

11. *Scalable Heuristics for Stochastic Programming with Scenario Selection*. Johns Hopkins University, Baltimore, MD. April 2012.

12. *Modeling and Optimization of Block-Composable Mathematical Programs using Coopr*. International Conference on Applied Mathematical Optimization and Modeling (APMOD) 2013, Paderborn, Germany. March 2012.

13. *Hands-On Lab: Using Python and the Algebraic Modeling Language Pyomo to Specify, Solve, and Analyze Mathematical Programs*. International Conference on Applied Mathematical Optimization and Modeling (AP-MOD) 2013, Paderborn, Germany. March 2012.

14. *Addressing Computational Challenges in Stochastic Energy Operations and Planning Problems*. Current Challenges in Computing 2011: Energy Resource Modeling workshop, Napa, CA. August 2011.

15. *Asynchronous Computation and Scenario Bundling for Progressive Hedging*. INFORMS Annual Meeting, Charlotte, NC. November 2011.

16. *An Experimental Analysis of Operator Splitting for Stochastic Programming*. INFORMS Annual Meeting, Charlotte, NC. November 2011.

17. *Multi-Stage Stochastic Unit Commitment via Accelerated Progressive Hedging*. INFORMS Annual Meeting, Charlotte, NC. November 2011.

18. *PySP: A Software Environment for Leveraging and Exploiting Deterministic Metaheuristics in the Solution of Stochastic Programs*. 9th Metaheuristics International Conference (MIC 2011), Udine, Italy. July 2011.

19. *Confidence Intervals and Solution Quality Estimation for Sensor Network Design*. 2011 Word Environmental and Water Resources Congress, Palm Springers, CA. May 2011.

20. *Computational Issues in Stochastic (Mixed-Integer) Programming: Scenario Sampling and Solution Stability*. INFORMS Annual Meeting, Austin, TX. November 2010.

21. *PySP: Modeling and Solving Stochastic Linear and Mixed-Integer Programs in Python*. INFORMS Annual Meeting, Austin, TX. November 2010.

22. *Computational Issues in Solving Large-Scale Stochastic Grid Expansion Problems*. INFORMS Annual Meeting, Austin, TX. November 2010.

23. *Stochastic Programming and Sensor Placement: Multi-Stage Formulations and Solution Quality Assessment*. Water Distribution Systems Analysis Conference (WSDA), Tucson, AZ. September 2010.

24. *PySP: Modeling and Solving Stochastic Linear and Mixed-Integer Programs in Python*. 12th International Conference on Stochastic Programming, Halifax, Canada. August 2010.

25. *Infrastructure Risk Management via Stochastic Programming: Models, Algorithms, and Software*. SIAM Annual Meeting, Pittsburgh, PA. July 2010.

26. *Algorithms and Software for Multi-Stage, Stochastic Mixed-Integer Programming Problems*. University of Wisconsin Madison, Madison, WI. March 2010.

27. *Scalable Heuristics for Stochastic Programming with Scenario Selection*. INFORMS Annual Meeting, San Diego, CA. October 2009.

28. *Closing the Gap: Lessons Learned from a PICO Comparative Performance Analysis*. INFORMS Annual Meeting, San Diego, CA. October 2009.

29. *Coopr: A Common Optimization Python Repository*. INFORMS Annual Meeting, San Diego, CA. October 2009.

30. *Robust optimization for the Sensor Placement Problem*. University of California Davis, Davis, CA. October 2009.

31. *A Hybrid Constraint Programming / Local Search Approach to the Job-Shop Scheduling Problem*. Eighth Metaheuristics International Conference, Hamburg, Germany. July, 2009.

32. *Assessing Metaheuristic Implementations for Massively Multi-Threaded Compute Architectures*. CORS-INFORMS International Meeting, Toronto, Canada. June, 2009.

33. *OR Challenges in Water Security Applications*. With William E. Hart. CORS-INFORMS International Meeting, Toronto, Canada. June, 2009.

34. *Scalable Heuristics for Stochastic Programming with Scenario Selection*. Conference on Engineering Risk Control and Optimization, University of Florida, Gainsville, Florida. February, 2009.

35. *Simulation-Based Spares Optimization for the Lockheed Martin Joint Strike Fighter*. Eleventh INFORMS Computing Society Conference, Charleston, South Carolina. January, 2009.

36. *Scalable Heuristics for Stochastic Programming with Scenario Selection*. Eleventh INFORMS Computing Society Conference, Charleston, South Carolina. January, 2009.

37. *The Templatized Metaheuristics Framework*. Eleventh INFORMS Computing Society Conference, Charleston, South Carolina. January, 2009.

38. *The Templatized Metaheuristics Framework*. INFORMS Annual Meeting, Washington, D.C. October, 2008.

39. *Solving a Scheduling Problem for a Quantum Computing Architecture Using Constraint Programming*. DOE Office of Science Applied Mathematics PI Meeting, Argonne National Laboratory, Chicago, Illinois. October, 2008.

40. *Manifold-Based Learning and Search Techniques for Semi-Interactive Global Optimization*. SIAM Conference on Optimization, Boston, Massachusetts. May, 2008.

41. *Optimization for Large-Scale, Simulation-Based Resource Allocation Problems: Two Real-World Case Studies*. University of Iowa, School of Management, Iowa City, Iowa. March, 2008.

42. *A Multi-Point Constructive Search / Metaheuristic Hybrid for Job Shop Scheduling*. INFORMS Annual Meeting. Seattle, Washington. November, 2007.

43. *Comparing Open-Source Linear and Mixed-Integer Linear Programming Solvers*. INFORMS Annual Meeting. Seattle, Washington. November, 2007.

44. *Extending Recent MIP Heuristics to Parallel Environments: Architecture and Performance Analysis*. INFORMS Annual Meeting. Seattle, Washington. November, 2007.

45. *A Progressive Hedging Approach to Optimizing an Enterprise-Scale Logistics Support System*. INFORMS International Meeting. Puerto Rico. July, 2007.

46. *Manifold-Based Learning and Search Techniques for Semi-Interactive Optimization*. INFORMS International Meeting. Puerto Rico. July, 2007.

47. *Invited Tutorial: Fitness Landscape Structure, Problem Difficulty, and Metaheuristic Behavior: A Critical Survey*. Seventh Metaheuristics International Conference. Montreal, Canada. June, 2007.

48. *The Templatized Metaheuristics Framework*. Seventh Metaheuristics International Conference. Montreal, Canada. June, 2007.

49. *Simultaneous Consumables, Resources, and Spares Optimization for Future Combat System Logistics*. 75th Military Operations Research Society Symposium. Annapolis, Maryland. June, 2007.

50. *Formulation and Optimization of Robust Sensor Placement Problems for Contaminant Warning System Design*. University of Colorado. Boulder, Colorado. April, 2007.

51. *Tutorial: Elite Pool Maintenance, Fitness Landscape Structure, and Long-Term Memory: Overview, Myths, and Open Frontier*. 2007 Learning and Intelligent Optimization Workshop. Andalo, Italy. February, 2007.

52. *A Fitness Landscape Analysis of the Vehicle Routing Problem and Implications for Metaheuristic Behavior*. INFORMS Annual Meeting. Pittsburgh, Pennsylvania. November, 2006.

53. *Formulation and Optimization of Robust Sensor Placement Problems for Contaminant Warning System Design*. 8th Water Distributions Systems Analysis Symposium. Cincinnati, Ohio. August, 2006.

54. *Advanced Tutorial: Fitness Landscapes and Problem Difficulty*. 2006 Genetic and Evolutionary Computation Conference. Seattle, Washington. July, 2006.

55. *Optimization of the Logistics Support Enterprise for the Lockheed Martin Joint Strike Fighter*. 74th Military Operations Research Symposium. Colorado Springs, Colorado. June, 2006.

56. *A Fitness Landscape Analysis of the Vehicle Routing Problem and Implications for Metaheuristic Behavior*. Optimization Days. Montreal, Canada. May, 2006.

57. *Optimization of the Logistics Support Enterprise for the Lockheed Martin Joint Strike Fighter*. DIMACS Workshop on Computational Optimization and Logistics Challenges in the Enterprise. Clinton, New Jersey. April, 2006.

58. *Formulation and Optimization of Robust Sensor Placement Problems for Contaminant Warning System Design*. Los Alamos National Laboratory Risk Symposium. Santa Fe, New Mexico. March, 2006.

59. *Spares Inventory Optimization for the Lockheed Martin Joint Strike Fighter*. INFORMS Annual Meeting. San Francisco, California. November, 2005.

60. *On Metaheuristic "Failure Modes": A Case Study in Tabu Search for Job-Shop Scheduling*. Sixth Metaheuristics International Conference. Vienna, Austria. August, 2005.

61. *Advanced Tutorial: Fitness Landscapes and Problem Difficulty*. 2005 Genetic and Evolutionary Computation Conference. Washington, D.C. June, 2005.

62. *Scalable High-Performance Heuristics for Sensor Placement in Water Distribution Networks*. World Water and Environmental Resources Congress. Anchorage, Alaska. May, 2005.

63. *Metaheuristic Failure Modes: Examining the Relationship Between Pool Maintenance, Long-Term Memory, and Search Space Structure*. Department of Mechanical and Industrial Engineering, University of Toronto. March, 2005. Invited.

64. *A Multiple-Objective Analysis of Sensor Placement Optimization in Water Networks*. Ninth INFORMS Computing Society Conference. Annapolis, Maryland. January, 2005.

65. *Spares Inventory Optimization for the Lockheed Martin Joint Strike Fighter*. 2004 Winter Simulation Conference. Washington, DC. December, 2004.

66. *On the Relationship Between Long-Term Memory, Pool Maintenance, and Fitness-Distance Correlation*. INFORMS Annual Meting. Denver, Colorado. October, 2004.

67. *Sensor Placement Optimization in Municipal Water Distribution Networks*. Department of Mechanical and Industrial Engineering, University of Toronto. September, 2004. Invited.

68. *A Multiple-Objective Analysis of Sensor Placement Optimization in Water Networks*. World Water and Environmental Resources Congress. Salt Lake City, Utah. June, 2004.

69. *Modeling the Dynamic Behavior of Metaheuristics: A Case Study in Job-Shop Scheduling*. CORS/SCRO-INFORMS International Meeting. Banff, Canada. May, 2004.

70. *Characterizing the Fitness Landscape of the Pickup and Delivery Problem with Time Windows*. CORS/SCRO-INFORMS International Meeting. Banff, Canada. May, 2004.

71. *Reconsidering the Effectiveness of Simulated Annealing for Job-Shop Scheduling*. Optimization Days. Montreal, Canada. May, 2004.

72. *Developing Empirical Models of Local Search: A Case Study in Job-Shop Scheduling*. Department of Computer Science, University of New Mexico. Albuquerque, New Mexico. October, 2003. Invited.

73. *Adaptive Search Algorithms and Fitness-Distance Correlation*. Fifth Metaheuristics International Conference (MIC-2003). Kyoto, Japan. September, 2003.

74. *An Analysis of Iterated Local Search for Job-Shop Scheduling*. Fifth Metaheuristics International Conference (MIC-2003). Kyoto, Japan. September, 2003.

75. *A Dynamic Model of Tabu Search for the Job-Shop Scheduling Problem*. The First Multidisciplinary International Conference on Scheduling (MISTA-2003). Nottingham, United Kingdom. August, 2003.

76. *Modeling Local Search Algorithm Performance in Scheduling*. AFOSR Optimization and Discrete Mathematics Program Review. Estes Park, Colorado. May, 2003.

77. *Modeling Local Search Algorithm Performance in Scheduling*. Wright State University, Colorado State University, Sandia National Laboratories, University of Missouri-Columbia, University of Memphis, University of Central Florida. January–March 2003. Invited.

78. *Toward an Understanding of Local Search in Job-Shop Scheduling.* ILOG Corporation. Paris, France. September, 2001. Invited.

79. *Toward an Understanding of Local Search in Job-Shop Scheduling.* The Sixth European Conference on Planning (ECP-01). Toledo, Spain. September, 2001.

80. *Toward a Descriptive Model of Local Search Cost in Job-Shop Scheduling.* The Seventeen International Joint Conference on Artificial Intelligence (IJCAI-01) Workshop on Stochastic Local Search. Seattle, Washington. August, 2001.

81. *Problem Difficulty and Fitness Landscapes of Structured and Random Job-Shop Scheduling Problems: What Do Existing Analysis Techniques Really Tell Us?* The European Conference on Artificial Intelligence (ECAI-2000) Workshop on Local Search for Planning and Scheduling. Berlin, Germany. August, 2000.

82. *Focusing on the Individual: Why We Need New Empirical Methods for Characterizing Problem Difficulty.* The European Conference on Artificial Intelligence (ECAI-2000) Workshop on Empirical Methods for Artificial Intelligence. Berlin, Germany. August, 2000.

83. *Algorithm Performance and Problem Structure for Flow-Shop Scheduling.* The Sixteenth National Conference on Artificial Intelligence (AAAI-99). Orlando, Florida. July, 1999.

84. *A Performance Assessment of Modern Niching Methods for Parameter Optimization Problems.* The Genetic and Evolutionary Computation Conference (GECCO-1999). Orlando, Florida. July, 1999.

Awards:

1. Finalist (with colleagues from Sandia, the US Environmental Protection Agency, and the University of Cincinnati) for the 2008 INFORMS Franz Edelman Award for Achievement in Operations Research and Management Sciences for the submission entitled "Reducing Security Risks in American Drinking Water Systems".

2. Best Paper Award, 1st Multidisciplinary International Conference on Scheduling (MISTA-03).

3. Best Paper Finalist, Sixth European Conference on Planning (ECP-01).

Professional Activities

Editorial Activities

    Associate Editor, INFORMS Journal on Computing
    Associate Editor, The Journal of Scheduling

Advisory Roles

    Scientific and Industrial Advisory Board Member, UK EPSRC LANCS Initiative (2009–2014)

Organizational Activities

Technical Program Chair, 2nd Learning and Intelligent Optimization Conference (LION II, 2007)
Co-chair, Doctoral Consortium, Seventeenth International Conference on Automated Planning and Scheduling (2007)
Metaheuristics and Local Search Track Chair, 2005 Genetic and Evolutionary Computation Conference
Electronic Publicity Chair, 2000 Genetic and Evolutionary Computation Conference

Program Committees

Twenty-First International Joint Conference on Artificial Intelligence (IJCAI-2009)
2009 Workshop on Engineering Stochastic Local Search Algorithms (SLS-2009)
Eighth Metaheuristics International Conference (MIC 2009)
4th Multidisciplinary International Conference on Scheduling (MISTA-2009)
Eighteenth International Conference on Automated Planning and Scheduling (ICAPS-2008)
Matheuristics 2008
Twenty Third National Conference on Artificial Intelligence (AAAI-2008)
3rd Multidisciplinary International Conference on Scheduling (MISTA-2007)
2007 Congress on Evolutionary Computation (CEC-2007)
Seventh Metaheuristics International Conference (MIC 2007)
Matheuristics 2007
Learning and Intelligent Optimization Workshop (LION 2007)
2007 Workshop on Engineering Stochastic Local Search Algorithms (SLS-2007)
Twenty Second National Conference on Artificial Intelligence (AAAI-2007)
2007 IEEE Symposium on Computational Intelligence in Scheduling
2006 Conference on Parallel Problem-Solving From Nature (PPSN-IX)
Twenty First National Conference on Artificial Intelligence (AAAI-2006)
2006 Congress on Evolutionary Computation (CEC-2006)
Sixteenth International Conference on Automated Planning and Scheduling (ICAPS-2006)
2nd Multidisciplinary International Conference on Scheduling (MISTA-2005)
2005 Congress on Evolutionary Computation (CEC-2005)
Twentieth National Conference on Artificial Intelligence (AAAI-2005)
2005 AAAI Workshop on Integrating Planning Into Scheduling (WIPIS-05)
Fifteenth International Conference on Automated Planning and Scheduling (ICAPS-2005)
2005 Genetic and Evolutionary Computation Conference (GECCO-2005)
2004 Conference on Parallel Problem-Solving From Nature (PPSN-VIII)
2004 ICAPS Workshop on Integrating Planning Into Scheduling (WIPIS-04)
2004 Genetic and Evolutionary Computation Conference (GECCO-2004)
2004 Congress on Evolutionary Computation (CEC-2004)
2003 Genetic and Evolutionary Computation Conference (GECCO-2003)
2003 Congress on Evolutionary Computation (CEC-2003)
7th Workshop on the Foundations of Genetic Algorithms (FOGA-2002)
2002 Genetic and Evolutionary Computation Conference (GECCO-2002)
2002 Congress on Evolutionary Computation (CEC-2002)
2001 Genetic and Evolutionary Computation Conference (GECCO-2001)
2000 Genetic and Evolutionary Computation Conference (GECCO-2000)

Journal Reviewing

Annals of Operations Research
Artificial Intelligence
Constraint Programming
Evolutionary Computation
IEEE Transactions on Evolutionary Computation

IEEE Transactions on Pattern Analysis and Machine Intelligence
IEEE Transactions on Power Systems
INFORMS Journal on Computing
International Journal of Power and Energy Systems
Journal of Artificial Intelligence Research
Journal of Digital Libraries
Journal of Experimental Algorithmics
Journal of Global Optimization
Journal of Heuristics
Journal of Scheduling
Journal of Mathematical Modeling and Algorithms
Journal of Water Resources Planning and Management
Swarm Intelligence

Additional Conference Reviewing

11th INFORMS Computing Society Conference (ICS-09)
13th International Conference on Principles and Practice of Constraint Programming (CP-2007)
Twentieth International Joint Conference on Artificial Intelligence (IJCAI-2007)
28th IEEE EMBS (Engineering in Medicine and Biology) Conference (2006)
11th International Conference on Principles and Practice of Constraint Programming (CP-2005)
Sixth International Workshop on Integration of AI, OR, and CP (CPAIOR-2004)
Seventh International Workshop on Integration of AI, OR, and CP (CPAIOR-2005)
Fourteenth International Conference on Automated Planning and Scheduling (ICAPS-2004)

Professional Affiliations

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