Manuel Laguna

MediaOne Professor of Management Science
Faculty Associate for Global Engagement
Leeds School of Business, University of Colorado **Boulder**

995 Regent Drive
Boulder, CO 80309-0419

laguna@colorado.edu
https://www.colorado.edu/faculty/laguna/

Education

Ph.D. in Operations Research and Industrial Engineering, University of Texas at Austin, May 1990

M.S. in Operations Research and Industrial Engineering, University of Texas at Austin, May 1987

B.S. in Industrial and Systems Engineering, Monterrey Tech at Querétaro, México, December 1981

Academic Experience

Professor, Management Science, Leeds School of Business, University of Colorado Boulder, June 2002 — present

Associate Professor, Operations Management, Leeds School of Business, University of Colorado Boulder, June 1998 — May 2002

Assistant Professor, Operations Management, Leeds School of Business, University of Colorado Boulder, September 1991 — May 1998

U S West Postdoctoral Fellow, Leeds School of Business, University of Colorado Boulder, September 1990 — August 1991

Assistant Instructor, Department of Mechanical Engineering, University of Texas at Austin, September 1988 — May 1990

Teaching Assistant, Department of Mechanical Engineering, University of Texas at Austin, January 1985 — May 1988

Assistant Professor, Department of Industrial and Systems Engineering, Monterrey Tech at Querétaro, January 1982 — December 1982

University Administration

Faculty Associate for Global Engagement, Office of the Provost – Strategic Initiatives, University of Colorado Boulder, October 2018 — Present.

Director of Global Initiatives, Leeds School of Business, University of Colorado Boulder, July 2012 — September 2018

Interim Dean, Leeds School of Business, University of Colorado Boulder, November 2009 — February 2011

Senior Associate Dean for Faculty and Research, Leeds School of Business, University of Colorado Boulder, July 2007 — October 2009 and March 2011 — June 2011

Chair, Operations and Information Management Division, Leeds School of Business, University of Colorado Boulder, July 2001 — June 2004

Director, Engineering Division, Monterrey Tech at San Luis Potosi, January 1983 — December 1983

Business Experience

Co-founder, OptTek Systems, Inc. (www.opttek.com), Boulder, Colorado, 1992

Faculty Associate, U S WEST Advanced Technologies, Boulder, Colorado, September 1991 — September 1996

Student Associate for Advanced Systems Research, U S WEST Advanced Technologies, Boulder, Colorado, Summer 1989

Consultant for Production Systems, Nagel Manufacturing and Supply Co., Austin, Texas, May 1988 — May 1989

Plant Engineer, Massey Ferguson, Querétaro, México, Summer 1981

Publications

Refereed Journal Articles

1. De Armas, J. and M. Laguna (forthcoming) "Parallel Machine, Capacitated Lot-Sizing and Scheduling for the Pipe-Insulation Industry," *International Journal of Production Research*.

2. Delgado-Antequera, L., M. Laguna, J. Pacheco, and R. Caballero (forthcoming) "A Bi-Objective Solution Approach to a Real-World Waste Collection Problem," *Journal of the Operational Research Society.*

3. López-Sánchez, A. D., J. Sánchez-Oro, and M. Laguna (forthcoming) "A New Scatter Search Design for Multiobjective Combinatorial Optimization with an Application to Facility Location," *INFORMS Journal on Computing*.

4. Peiró, J., A. Corbarán, M. Laguna, and R. Martí (2018) "Models and Solution Methods for the Uncapacitated r-Allocation p-Hub Center Problem," *International Transactions in Operations Research,* vol. 25, no. 4, pp. 1241-1267.

5. Martínez-Gavara, A., V. Campos, M. Laguna and R. Martí (2017) "Heuristic Solution Approaches for the Maximum MinSum Dispersion Problem," *Journal of Global Optimization*, vol. 67, no. 3, pp. 671-686.

6. Sánchez-Oro, J., A. Martínez-Gavara, M. Laguna, R Martí, and A. Duarte (2017) "Variable Neighborhood Scatter Search for the Incremental Graph Drawing Problem," *Computational Optimization and Applications*, vol. 68, no. 3, pp. 775-797.

7. Zais, M. and M. Laguna (2017) "A Simulation-Optimization Approach to Estimate Workforce Requirements," *Military Operations Research*, vol. 22, no. 1, pp. 19-37.

8. Lozano, M., M. Laguna, R. Martí, F. J. Rodríguez, and C. García-Martínez (2016) "A Genetic Algorithm for the Minimum Generating Set Problem," *Applied Soft Computing*, vol. 48, pp. 254-264.

9. Sánchez-Oro, J., M. Laguna, A. Duarte and R. Martí (2016) "Scatter Search for the Bandpass Problem," *Journal of Global Optimization,* vol. 66, no. 4, pp. 769-790.

10. Zais, M. and M. Laguna (2016) "A Graph Coloring Approach to the Deployment Scheduling and Unit Assignment Problem," *Journal of Scheduling,* vol. 19, no. 1, pp. 73-90.

11. Caballero, R., A. Hernandez-Díaz, M. Laguna, and J. Molina (2015) "Cross Entropy for Multiobjective Combinatorial Optimization Problems with Linear Relaxations," *European Journal of Operational Research*, vol. 243, no. 2, pp. 362-368.

12. Dewil, R., M. Laguna, T. Vossen, P. Vansteenwegen, and D. Cattrysse (2015) "An Improvement Heuristic Framework for the Laser Cutting Tool Path Problem," *International Journal of Production Research*, vol. 53, no. 6, pp. 1761-1776.

13. Ganguly, S. and M. Laguna (2015) "Modeling and Solving a Cyclic and Batching Scheduling Problem with Two Types of Setups," *IIE Transactions,* vol. 47, pp. 880-891.

14. Martínez-Gavara, A., V. Campos, M. Gallego, M. Laguna and R. Martí (2015) "Tabu Search and GRASP for the Capacitated Clustering Problem," *Computational Optimization and Applications*, vol. 62, no. 2, pp. 589-607.

15.   Pastor, R., A. García-Villoria, M. Laguna and R. Martí (2015) "Metaheuristic Procedures for the Lexicographic Bottleneck Assembly Line Balancing Problem," *Journal of the Operational Research Society*, vol. 66, no. 11, pp. 1815-1825.

16.   Sánchez-Oro, M. Laguna, A. Duarte and R. Martí (2015) "Scatter Search for the Profile Minimization Problem," *Networks*, vol. 65, no. 1, pp. 10-21.

17.   Duarte, A., M. Laguna, R. Martí and J. Sánchez-Oro (2014) "Optimization Procedures for the Bipartite Unconstrained 0-1 Quadratic Programming Problem," *Computers & Operations Research*, vol. 51, pp. 123-129.

18.   Laguna, M., R. Martí, F. Gortázar, M. Gallego and A. Duarte (2014) "A Black-box Scatter Search for Optimization Problems with Integer Variables," *Journal of Global Optimization,* vol. 58, pp. 497-516.

19.   Lukač, Z. and M. Laguna (2013) "Core-Based GRASP for Delay-Constrained Group Communications," *International Journal of Applied Metaheuristic Computing,* vol. 4, no. 4, pp. 1-22.

20.   Gallego, M., M. Laguna, R. Martí and A. Duarte (2013) "Tabu Search with Strategic Oscillation for the Maximally Diverse Grouping Problem," *Journal of the Operational Research Society,* vol. 64, no. 5, pp. 724-734.

21.   Pacheco, J., R. Caballero, M. Laguna and J. Molina (2013) "Bi-objective Bus Routing: An Application to School Buses in Rural Areas," *Transportation Science,* vol. 14, no. 3, pp. 397-411.

22.   Samorani, M. and M. Laguna (2012) "Data Mining Driven Neighborhood Search," *INFORMS Journal on Computing,* vol. 24, no. 2, pp. 210-227.

23.   Caballero, R., M. Laguna, R. Martí and J. Molina (2011) "Scatter Tabu Search for Multiobjective Clustering Problems," *Journal of the Operational Research Society*, vol. 62, pp. 2034-2046.

24.   Duarte, A., M. Laguna and R. Martí (2011) "Tabu Search for the Linear Ordering Problem with Cumulative Costs," *Computational Optimization and Applications*, vol. 48, pp. 697-715.

25.   Glover, F., L. Lasdon, J. Plummer, A. Duarte, R. Martí, M. Laguna and C. Rego (2011) "Pseudo-Cut Strategies for Global Optimization," *International Journal of Applied Metaheuristic Computing,* vol. 2, no. 4, pp. 1-12.

26.   Maquera, G., M. Laguna, D. A. Gandelman and A. P. Sant'Anna (2011) "Scatter Search Applied to the Vehicle Routing Problem with Simultaneous Delivery and Pickup," *International Journal of Applied Metaheuristic Computing*, vol. 2, no. 2, pp. 1-20.

27.   Samorani, M., M. Laguna, R. K. DeLisle and D. C. Weaver (2011) "A Randomized Exhaustive Propositionalization Approach for Molecule Classification," *INFORMS Journal on Computing*, vol. 23, no. 3, pp. 331-345.

28.   Yin, P-Y, F. Glover, M. Laguna and J-X Zhu (2011) "A Complementary Cyber Swarm Algorithm," *International Journal of Swarm Intelligence Research,* vol. 2, no. 2, pp. 22-41.

29.   Duarte, A., F. Glover, M. Laguna, L. Lasdon and R. Martí (2010) "Adaptive Memory Programming for Constrained Global Optimization," *Computers and Operations Research,* vol. 37, pp. 1500-1509.

30.   Gortazar, F., A. Duarte, M. Laguna, R. Martí (2010) "Black Box Scatter Search for General Classes of Binary Optimization Problems," *Computers and Operations Research*, vol. 37, no. 11, pp. 1977-1986.

31.   Laguna, M., J. Molina, F. Pérez, R. Caballero and A. Hernández-Díaz (2010) "The Challenge of Optimizing Expensive Black Boxes: A Scatter Search / Rough Set Theory Approach," *Journal of the Operational Research Society*, vol. 61, no. 1, pp. 53-67.

32.   Yin, P-Y, F. Glover, M. Laguna and J-X Zhu (2010) "Cyber Swarm Algorithms – Improving Particle Swarm Optimization Using Adaptive Memory Strategies," *European Journal of Operational Research*, vol. 201, no. 2, pp. 377-389.

33.   Duarte, A., M. Gallego, M. Laguna and R. Martí (2009) "Hybrid Heuristics for the Maximum Diversity Problem," *Computational Optimization and Applications*, vol. 44, no. 3, pp. 411-426.

34.   Laguna, M., A. Duarte and R. Martí (2009) "Hybridizing the Cross Entropy Method: An Application to the Max-Cut Problem," *Computers and Operations Research*, vol. 36, no. 2, pp. 487-498.

35.   Laguna, M., J. O. Roa, A. R. Jiménez and F. Seco (2009) "Diversified Local Search for the Optimal Layout of Beacons in an Indoor Positioning System," *IIE Transactions*, vol. 41, no. 3, pp. 247-259.

36.   Martí, R., A. Duarte and M. Laguna (2009) "Advanced Scatter Search for the Max-Cut Problem," *INFORMS Journal on Computing,* vol. 21, no. 1, pp. 26-38.

37.   Jozefowiez, N., M. Laguna and F. Glover (2008) "A Multi-Objective Evolutionary Algorithm for the Traveling Salesman Problem with Profits," *Journal of Mathematical Modeling and Algorithms,* vol. 7, pp. 177-195.

38. Alegre, J., M. Laguna and J. Pacheco (2007) "Optimizing the Periodic Pick-up of Raw Materials for a Manufacturer of Auto Parts," *European Journal of Operational Research,* vol. 179, no. 3, pp. 736-746.

39. Better, M., F. Glover and M. Laguna (2007) "Advances in Analytics: Integrating Dynamic Data Mining with Simulation Optimization," *IBM Journal of Research and Development*, vol. 51, no. 3/4, pp. 477-487.

40. Molina, J., M. Laguna, R. Martí and R. Caballero (2007) "SSPMO: A Scatter Search Procedure for Non-Linear Multiobjective Optimization," *INFORMS Journal on Computing,* vol. 19, no. 1, pp. 91-100.

41. Yamashita, D. S., V. A. Armentano and M. Laguna (2007) "Robust Optimization Models for Project Scheduling with Resource Availability Cost," *Journal of Scheduling,* vol. 10, no. 1, pp. 67-76.

42. Adenso-Díaz, B. and M. Laguna (2006) "Fine-tuning of Algorithms Using Partial Experimental Designs and Local Search," *Operations Research,* vol. 54, no. 1, pp. 99-114*.*

43. Laguna, M. (2006) "Implementing and Testing the Tabu Cycle and Conditional Probability Methods," *Computers and Operations Research,* vol. 33, pp. 2495-2507.

44. Martí, R., M. Laguna and F. Glover (2006) "Principles of Scatter Search," *European Journal of Operational Research,* vol. 169, no. 2, pp. 359-372.

45. Yamashita, D. S., V. A. Armentano and M. Laguna (2006) "Scatter Search for Project Scheduling with Resource Availability Cost," *European Journal of Operational Research,* vol. 169, no. 2, pp. 623-637.

46. Campos, V., M. Laguna and R. Martí (2005) "Context-Independent Scatter and Tabu Search for Permutation Problems," *INFORMS Journal on Computing,* vol. 17, no. 1, pp. 111-122.

47. Casado, S., M. Laguna and J. Pacheco (2005) "Heuristical Labor Scheduling to Optimize Airport Passenger Flows," *Journal of the Operational Research Society,* vol. 56, no. 6, pp. 649-658.

48. Delgado, C., M. Laguna and J. Pacheco (2005) "Minimizing Labor Requirements in a Periodic Vehicle Loading Problem," *Computational Optimization and Applications,* vol. 32, pp. 299-320.

49. Laguna, M. and R. Martí (2005) "Experimental Testing of Advanced Scatter Search Designs for Global Optimization of Multimodal Functions," *Journal of Global Optimization,* vol. 33, pp. 235-255.

50.   Melián, B., M. Laguna and J. A. Moreno-Pérez (2005) "Minimizing the Cost of Placing and Sizing Wavelength Division Multiplexing and Optical Cross-Connect Equipment in a Telecommunications Network," *Networks,* vol. 45, no. 4, pp. 199-209.

51.   González-Velarde, J. L. and M. Laguna (2004) "A Benders-based Heuristic for the Robust Capacitated International Sourcing Problem," *IIE Transactions*, vol. 36, pp. 1125-1133*.*

52.   Melián, B., M. Laguna and J. A. Moreno-Pérez (2004) "Capacity Expansion of Fiber Optic Networks with WDM Systems: Problem Formulation and Comparative Analysis," *Computer and Operations Research*, vol. 31, no. 3, pp. 461-472.

53.   Scrich, C. R., V. A. Armentano and M. Laguna (2004) "Tardiness Minimization on a Flexible Job Shop: A Tabu Search Approach," *Journal of Intelligent Manufacturing*, vol. 15, no. 1, pp. 103-115.

54.   Martí, R. and M. Laguna (2003) "Heuristics and Meta-Heuristics for 2-Layer Straight Line Crossing Minimization," *Discrete Applied Mathematics*, vol. 127, no. 3, pp. 665-678.

55.   Martí, R. and M. Laguna (2003) "Scatter Search: Diseño Básico y Estrategias Avanzadas," *Revista Iberoamericana de Inteligencia Artificial*, vol. 2, no. 4, pp. 123-130.

56.   Osorio, M. A. and M. Laguna (2003) "Logic Cuts for Multilevel Generalized Assignment Problems," *European Journal of Operational Research*, vol. 151, pp. 238-246.

57.   Corberán, A., E. Fernández, M. Laguna and R. Martí (2002) "Heuristic Solutions to the Problem of Routing School Buses with Multiple Objectives," *Journal of the Operational Research Society,* vol. 53, no. 4, pp. 427-435.

58.   González-Velarde, J. L. and M. Laguna (2002) "Tabu Search with Simple Ejection Chains for Coloring Graphs," *Annals of Operations Research,* vol. 117, pp. 165-174*.*

59.   Laguna, M. and R. Martí (2002) "Neural Network Prediction in a System for Optimizing Simulations," *IIE Transactions,* vol. 34, no. 3, pp. 273-282.

60.   Campos, V., F. Glover, M. Laguna and R. Martí (2001) "An Experimental Evaluation of a Scatter Search for the Linear Ordering Problem," *Journal of Global Optimization*, vol. 21, pp. 397-414.

61.   Díaz, A. and M. Laguna (2001) "A Pseudo-Greedy Heuristic for the Rectilinear Steiner Problem," *International Journal of Operations and Quantitative Management,* vol. 7, no. 2, pp. 105-118.

62.   Laguna, M. and R. Martí (2001) "A GRASP for Coloring Sparse Graphs," *Computational Optimization and Applications*, vol. 19, no. 2, pp. 165-178.

63.   Martí, R., M. Laguna, F. Glover and V. Campos (2001) "Reducing the Bandwidth of a Sparse Matrix with Tabu Search," *European Journal of Operational Research*, vol. 135, no. 2, pp. 450-459.

64.   Glover, F., M. Laguna and R. Martí (2000) "Fundamentals of Scatter Search and Path Relinking," *Control and Cybernetics,* vol. 39, no. 3, pp. 653-684.

65.   Laguna, M., P. Lino, A. Pérez and S. Quintanilla and V. Valls (2000) "Minimizing Weighted Tardiness of Jobs with Stochastic Interruptions in Parallel Machines," *European Journal of Operational Research*, vol. 127, no. 2, pp. 444-457.

66.   Laguna, M. (1999) "A Heuristic for Production Scheduling and Inventory Control in the Presence of Sequence-Dependent Setup Times," *IIE Transactions,* vol. 31, no. 2, pp. 125-134.

67.   Laguna, M. and R. Martí (1999) "GRASP and Path Relinking for 2-Layer Straight Line Crossing Minimization," *INFORMS Journal on Computing,* vol. 11, no. 1, pp. 44-52.

68.   Laguna, M., R. Martí and V. Campos (1999) "Intensification and Diversification with Elite Tabu Search Solutions for the Linear Ordering Problem," *Computers and Operations Research*, vol. 26, pp. 1217-1230.

69.   Lippai, I., J. P. Heaney and M. Laguna (1999) "Robust Water System Design with Commercial Intelligent Search Optimizers," *Computing in Civil Engineering*, vol. 13, no. 3, pp. 135-143.

70.   Mausser, H. and M. Laguna (1999) "A Heuristic to Minimax Absolute Regret for Linear Programs with Interval Objective Function Coefficients," *European Journal of Operational Research*, vol. 117, pp. 157-174.

71.   Mausser, H. and M. Laguna (1999) "Minimising the Maximum Relative Regret for Linear Programmes with Interval Objective Function Coefficients," *Journal of the Operational Research Society*, vol. 50, pp. 1063-1070.

72.   Laguna, M. (1998) "Applying Robust Optimization to Capacity Expansion of One Location in Telecommunications with Demand Uncertainty," *Management Science,* vol. 44, no. 11, pp. S101-S110.

73.   Mausser, H. and M. Laguna (1998) "A New Mixed Integer Formulation for the Maximum Regret Problem," *International Transactions in Operational Research*, vol. 5, no. 5, pp. 389-403.

74.   Adenso-Díaz, B. and M. Laguna (1997) "A Technique to Minimize Overtime in the Capacitated MRP Problem," *Production and Operations Management*, vol. 5, no. 4, pp. 357-370.

75. Glover, F. and M. Laguna (1997) "General Purpose Heuristics for Integer Programming — Part I," *Journal of Heuristics,* vol. 2, no. 4, pp. 343-358.

76. Glover, F. and M. Laguna (1997) "General Purpose Heuristics for Integer Programming — Part II," *Journal of Heuristics,* vol. 3, no. 2, pp. 161-179.

77. Laguna, M., R. Martí and V. Valls (1997) "Arc Crossing Minimization in Hierarchical Digraphs with Tabu Search," *Computers and Operations Research,* vol. 24, no. 12, pp. 1175-1186.

78. Adenso-Díaz, B. and M. Laguna (1996) "Modeling the Load Levelling Problem in Master Production Scheduling for MRP Systems," *International Journal of Production Research*, vol. 34, no. 2, pp. 483-493.

79. Glover, F., J. P. Kelly and M. Laguna (1995) "Genetic Algorithms and Tabu Search: Hybrids for Optimization," *Computers and Operations Research*, vol. 22, no. 1, pp. 111-134.

80. Laguna, M., J. P. Kelly, J. L. González Velarde, and F. Glover (1995) "Tabu Search for the Multilevel Generalized Assignment Problem," *European Journal of Operational Research*, vol. 82, pp. 176-189.

81. Laguna, M. and P. Laguna (1995) "Applying Tabu Search to the Two-dimensional Ising Spin Glass," *International Journal of Modern Physics C,* vol. 6, no. 1, pp. 11-23.

82. Kelly, J. P., M. Laguna and F. Glover (1994) "A Study on Diversification Strategies for the Quadratic Assignment Problem," *Computers and Operations Research*, vol. 21, no. 8, pp. 885-893.

83. Laguna, M. (1994) "A Guide to Implementing Tabu Search," *Investigación Operativa*, vol. 4, no. 1, pp. 5-25.

84. Laguna, M. (1994) "Clustering for the Design of SONET Rings in Interoffice Telecommunications," *Management Science*, vol. 40, no. 11, pp. 1533-1541.

85. Laguna, M., T. Feo and H. Elrod (1994) "A Greedy Randomized Adaptive Search Procedure for the 2-Partition Problem," *Operations Research*, vol. 42, no. 4, pp. 677-687.

86. Barnes, J. W. and M. Laguna (1993) "A Tabu Search Experience in Production Scheduling," *Annals of Operations Research,* vol. 41, pp. 141-156.

87. Barnes, J. W. and M. Laguna (1993) "Solving the Multiple-Machine Weighted Flow Time Problem Using Tabu Search," *IIE Transactions*, vol. 25, no. 2, pp. 121-127.

88.	Laguna, M., J. W. Barnes and F. Glover (1993) "Intelligent Scheduling with Tabu Search: An Application to Jobs with Linear Delay Penalties and Sequence Dependent Setup Costs and Times," *Journal of Applied Intelligence,* vol. 3, pp. 159-172.

89.	Laguna, M. and F. Glover (1993) "Bandwidth Packing: A Tabu Search Approach," *Management Science,* vol. 39, no. 4, pp. 492-500.

90.	Laguna, M. and F. Glover (1993) "Integrating Target Analysis and Tabu Search for Improved Scheduling Systems," *Expert Systems with Applications,* vol. 6, pp. 287-297.

91.	Glover, F. and M. Laguna (1991) "Target Analysis to Improve a Tabu Search Method for Machine Scheduling," *The Arabian Journal for Science and Engineering*, vol. 16, no. 2B, pp. 239-253.

92.	Laguna, M., J. W. Barnes and F. Glover (1991) "Tabu Search Methods for a Single Machine Scheduling Problem," *Journal of Intelligent Manufacturing*, vol. 2, pp. 63-74.

93.	Laguna, M. and J. L. González Velarde (1991) "A Search Heuristic for Just-in-Time Scheduling in Parallel Machines," *Journal of Intelligent Manufacturing*, vol. 2, pp. 253-260.

94.	Barnes, J. W., F. J. Swehosky and M. Laguna (1988) "Using an Instructional LAN to Teach a Statistics Course," *Technological Horizons in Education Journal*, vol. 16, pp. 80-84.

Books

95.	Laguna, M. and J. Marklund (2019) *Business Process Modeling, Simulation and Design, Third Edition*, CRC Press Taylor and Francis Group: Boca Raton, ISBN: 978-1-138-06173-6, 542 pp.

96.	Duarte, A., M. Laguna, and R. Martí (2018) *Metaheuristics for Business Analytics: A Decision Modeling Approach,* Springer: Switzerland, ISBN: 2364-678X, 136 pp.

97.	Laguna, M. and R. Martí (2003) *Scatter Search: Methodology and Implementations in C*, Kluwer Academic Publishers: Boston, ISBN 1-4020-7376-3, 312 pp.

98.	Glover, F. and M. Laguna (1997) *Tabu Search,* Kluwer Academic Publishers: Boston, ISBN 0-7923-9965-X, 408 pp.

99.	Adenso-Díaz, B., H. M. Ghaziri, F. Glover, J. L. Gonzalez, M. Laguna, P. Moscato, and F. T. Tseng (1996) *Optimización Heurística y Redes Neuronales en Dirección de Operaciones e Ingeniería*, Paraninfo: Madrid, ISBN: 84-283-2269-4, 235 pp.

Chapters in Books, Handbooks and Encyclopedias

100.   Laguna, M. (2018) "Tabu Search" in *Handbook of Heuristics*, R. Martí, P. Pardalos, and M. G. Resende (Eds.), Springer: New York.

101.   Laguna, M. (2018) "Tabu and Scatter Search: Principles and Practice," INFORMS *TutORials in Operations Research*, October 2018, pp. 130-157.

102.   Laguna, M. (2018) "Tabu Search" in *Handbook of Discrete and Combinatorial Mathematics* (Second Edition), K. H. Rosen (Ed.), CRC Press, pp. 1241–1250.

103.   Laguna, M. (2014) "Scatter Search" in *Search Methodologies: Introductory Tutorials in Optimization and Decision Support Techniques,* E. K. Burke and G. Kendall (eds.), Springer: New York, pp. 119-141.

104.   Glover, F. and M. Laguna (2013) "Tabu Search" in *Handbook of Combinatorial Optimization* (2nd Edition)*,* D-Z Du and P. M. Pardalos (Eds.), Springer, pp. 3261-3362.

105.   Laguna, M. and R. Martí (2013) "Heuristics" in *Encyclopedia of Operations Research & Management Science* (3rd Edition), S. Gass and M. Fu (Eds.), Springer, pp. 695-703.

106.   Laguna M., R. Martí, M. Gallego and A. Duarte (2011) "The Scatter Search Methodology" in *Wiley Encyclopedia of Operations Research and Management Science*, C. Smith (Area Editor) and A. Lokketangen (Topical Editor), vol. 7, pp. 4692-4703.

107.   Glover, F., M. Laguna and R. Martí (2007) "Principles of Tabu Search" in *Approximation Algorithms and Metaheuristics*, T. Gonzalez (ed.), Chapman & Hall/CRC, pp. 23-1-23-12.

108.   Laguna, M. and V. Armentano (2005) "Lessons from Applying and Experimenting with Scatter Search," *Metaheuristic Optimization Via Adaptive Memory and Evolution: Tabu Search and Scatter Search*, C. Rego and B. Alidaee (eds.), Norwell, MA: Kluwer Academic Publishers, pp. 229-246.

109.   Laguna, M. and T. Wubbena (2005) "Modeling and Solving a Selection and Assignment Problem," in *The Next Wave in Computing, Optimization, and Decision Technologies,* B. L. Golden S. Raghavan and E. A. Wasil (eds.), Springer, New York, ISBN: 0-387-23528-0, pp. 149-162.

110.   Martí, R., M. Laguna and V. Campos (2005) "Scatter Search vs. Genetic Algorithms: An Experimental Evaluation with Permutation Problems," *Metaheuristic Optimization Via Adaptive Memory and Evolution: Tabu Search and Scatter Search*, C. Rego and B. Alidaee (eds.), Norwell, MA: Kluwer Academic Publishers, pp. 263-282.

111.   Glover, F., M. Laguna and R. Martí (2004) "Scatter Search and Path Relinking: Foundations and Advanced Designs," in *New Optimization Techniques in Engineering,* G. C. Onwubolu and B. V. Babu (eds.), Springer, Berlin, ISBN: 3-540-20167-X, pp. 87-99.

112.   Glover, F., M. Laguna and R. Martí (2004) "New Ideas and Applications of Scatter Search and Path Relinking," in *New Optimization Techniques in Engineering,* G. C. Onwubolu and B. V. Babu (eds.), Springer, Berlin, ISBN: 3-540-20167-X, pp. 367-383.

113.   Glover, F., M. Laguna and R. Martí (2003) "Scatter Search," in *Advances in Evolutionary Computation: Theory and Applications,* A. Ghosh and S. Tsutsui (eds.), Springer-Verlag, New York, pp. 519-537.

114.   Glover, F., M. Laguna and R. Martí (2003) "Scatter Search and Path Relinking: Advances and Applications," in *Handbook of Metaheuristics,* F. Glover and G. Kochenberger (eds.), Kluwer Academic Publishers, Boston, pp. 1-35.

115.   Glover, F. and M. Laguna (2002) "Tabu Search," in *Handbook of Applied Optimization,* P. M. Pardalos and M. G. C. Resende (Eds.), Oxford University Press, New York, pp. 194-208.

116.   Laguna, M. (2002) "Scatter Search," in *Handbook of Applied Optimization,* P. M. Pardalos and M. G. C. Resende (Eds.), Oxford University Press, New York, pp. 183-193.

117.   Laguna M. and R. Martí (2002) "The OptQuest Callable Library," *Optimization Software Class Libraries*, Stefan Voss and David L. Woodruff (eds.), Kluwer Academic Publishers, Boston, pp. 193-218.

118.   Martí, R., H. Lourenço and M. Laguna (2000) "Assigning Proctors to Exams with Scatter Search," in *Computing Tools for Modeling, Optimization and Simulation: Interfaces in Computer Science and Operations Research*, M. Laguna and J. L. González-Velarde (Eds.), Kluwer Academic Publishers, Boston, pp. 215-227.

119.   Campos, V., M. Laguna and R. Martí (1999) "Scatter Search for the Linear Ordering Problem," in *New Ideas in Optimization*, D. Corne, M. Dorigo and F. Glover (Eds.), McGraw-Hill, pp. 331-339.

120.   Glover, F. and M. Laguna (1998) "Tabu Search," in *Handbook of Combinatorial Optimization,* D-Z Du and P. M. Pardalos (Eds.), Kluwer Academic Publishers, Boston, vol. 3, pp. 621-757.

121.   Valls, V., M. Laguna, P. Lino, A. Pérez and S. Quintanilla (1998) "Project Scheduling with Stochastic Activity Interruptions," in *Project Scheduling: Recent Models, Algorithms and Applications,* Jan Weglarz (Ed.), Kluwer Academic Publishers, Boston, pp. 333-353.

122. Adenso-Díaz, B., F. Glover and M. Laguna (1997) "New Search Heuristics for Decision Making," in *Expert Information Systems,* A. Zimitrovich, Tetrasistems, Minsk, pp. 281-360. In Russian.

123. Barnes, J. W., M. Laguna and F. Glover (1995) "An Overview of Tabu Search Approaches to Production Scheduling Problems," in *Intelligent Scheduling Systems,* D. E. Brown and W. T. Scherer (Eds.), Kluwer Academic Publishers, Boston, pp. 101-127.

124. Glover, F. and M. Laguna (1993) "Tabu Search," in *Modern Heuristic Techniques for Combinatorial Problems*, C. Reeves (Ed.), Blackwell Scientific Publications, Oxford, pp. 70-150.

Refereed Proceedings

125. Martínez-Gavara, A., V. Campos, M. Laguna and R. Martí (2013) "Una Comparación del Método Tabu y GRASP para el Problema de Clasificación con Capacidades," *Proceedings of the IX Congreso Español sobre Metaheuristicas, Algoritmos Evolutivos y Bioinspirados* (MAEB), A. Duarte and J. I. Hidalgo (Eds.), Madrid (Spain), pp. 773-781.

126. Sánchez-Oro, J., A. Duarte, M. Laguna and R. Martí (2013) "Scatter Search Aplicado al Problema de la Minimización del Profile de Matrices y Grafos," *Proceedings of the IX Congreso Español sobre Metaheuristicas, Algoritmos Evolutivos y Bioinspirados* (MAEB), A. Duarte and J. I. Hidalgo (Eds.), Madrid (Spain), pp. 842-851.

127. Laguna, M. (2012) "Adpative Sampling and OptQuest for Expensive Black-Box Optimization," *Proceedings of the VIII Congreso Español sobre Metaheuristicas, Algoritmos Evolutivos y Bioinspirados* (MAEB), J. A. Gámez-Martín, J. M. Puerta Callejón, F. Parreño Torres and L. de la Ossa Jiménez (Eds.), Albacete (Spain), pp. 157-164

128. April, J., M. Better, F. Glover, J. Kelly and M. Laguna (2006) "Enhancing Business Process Management with Simulation-Optimization," *Proceedings of the 2006 Winter Simulations Conference*, L. F. Perrone, F. P. Wieland, J. Liu, B. G. Lawson, D. M. Nicol, and R. M. Fujimoto (Eds.), pp. 642-649.

129. April, J., F. Glover, J. Kelly and M. Laguna (2003) "Practical Introduction to Simulation Optimization," *Proceedings of the 2003 Winter Simulation Conference*, S. Chick, P. J. Sánchez, D. Ferrin, and D. J. Morrice (Eds.), New Orleans, pp. 71-78.

130. Melián, B., M. Laguna and J. A. Moreno (2002) "Survivability in DWDM Optical Networks," *Proceedings of the Simposio de Informática y Telecomunicaciones,* R. Corchuelo, A. Ruiz-Cortés and D. Sevilla (Eds.), Sevilla (Spain), pp. 121-130.

131. Cox, L. A., M. Laguna, B. Melián, J. A. Moreno-Pérez, and J. Sanchez (2001) "Optimizing Placement and Sizing of Wave Division Multiplexing and Optical Cross-Connect

Equipment", *Proceedings of the 9th International Conference on Telecommunication Systems, Modeling and Analysis*, pp. 98-107.

132. Glover, F., J. P. Kelly and M. Laguna (1999) "New Advances for Wedding Optimization and Simulation," *Proceedings of the 1999 Winter Simulation Conference,* P. A. Farrington, H. B. Nembhard, D. T. Sturrock and G. W. Evans (Eds.), pp. 255-260.

133. Glover, F., J. P. Kelly and M. Laguna (1996) "New Advances and Applications of Combining Simulation and Optimization," *Proceedings of the 1996 Winter Simulation Conference,* J. M. Charnes, D. J. Morrice, D. T. Brunner, and J. J. Swain (Eds.), pp. 144-152.

134. Henze, G., M. Laguna and M Krarti (1996) "Heuristics for the Optimal Control of Thermal Energy Storage," *Meta-Heuristics: Theory and Applications,* J. P. Kelly and I. Osman (Eds.), Kluwer Academic Publishers, pp. 183-201.

135. Laguna, M. (1995) "Methods and Strategies for Robust Combinatorial Optimization," *Operations Research Proceedings 1994,* U. Derigs, A. Bachem, and A. Drexl (Eds.), Springer-Verlag, Berlin Heidelberg, pp. 103-108.

Un-refereed Proceedings and Electronic Publications

136. Laguna, M. (2002) "Global Optimization and Meta-Heuristics," in Optimization and Operations Research, Edited by Ulrich Derigs, in *Encyclopedia of Life Support Systems* (EOLSS), Developed under the Auspices of UNESCO, Eolss Publishers, Oxford, UK, http://www.eolss.net.

137. Laguna, M. (1999) "Optimization of Simulated Systems: A Telecommunication Application," *Proceedings of the III Congreso Internacional Sudamericano de Ingeniería de Sistemas e Informática*, pp. 1-12.

138. Laguna, M. (1998) "Optimization of Complex Systems with OptQuest," Decisioneering, http://www.decisioneering.com/optquest/complexsystems.html.

139. Laguna, M. (1997) "Metaheuristic Optimization with Evolver, Genocop and OptQuest," *EURO / INFORMS Joint International Meeting 1997 Plenaries and Tutorials*, J. Barceló (Ed.), pp. 141-150.

Edited Volumes

140. Ríos-Mercado, R. Z., J. L. González-Velarde, M. Laguna (2017) "Operations Research at CLAIO XVII (ALIO/SMIO Joint International Meeting)," *Annals of Operations Research*, vol. 258, no. 2.

141. Gambardella, L., A. Hertz, M. Laguna and M. Widmer (2003) "Special Issue on Meta-heuristics in Combinatorial Optimization," *European Journal of Operational Research*, vol. 151, no. 2, pp. 247-446.

142. Laguna, M. and J. L. González-Velarde (2000) *Computing Tools for Modeling, Optimization and Simulation: Interfaces in Computer Science and Operations Research*, Kluwer Academic Publishers, Boston, ISBN 0-7923-7718-4, 328 pp.

143. Glover, F., M. Laguna, E. Taillard, and D. de Werra (1993) "Tabu Search," *Annals of Operations Research*, vol. 41.

Software Manuals

144. Evans, J. and M. Laguna (1998) "OptQuest for Crystal Ball User Manual," *Crystal Ball Pro,* Decisioneering.

145. Barnes, J. W. and M. Laguna (1988) "Microcomputer Software and User's Manual for Statistical Analysis for Engineers: A Computer-Based Approach," *Prentice Hall.*

Book Reviews

146. Laguna, M. (2000) "Robust Discrete Optimization and its Applications by P. Kouvelis and G. Yu, Kluwer Academic Publishers," *IIE Transactions,* vol. 32, no. 3.

Articles Submitted for Publication and Work in Progress

147. Delgado, S., M. Laguna, J. Pacheco, and J. C. Puche (revised and resubmitted) "Grouping Products to Optimize Production Processes," *European Journal of Operational Research.*

148. Nenova, Z., M. Laguna, and D. Zhang (work in progress) "Approximate Dynamic Programming for a Dynamic Appointment Scheduling Problem."

149. López-Sánchez, A. D., A. G. Hernández-Díaz, J. Molina, and M. Laguna (submitted) "Optimizing a Bi-Objective Vehicle Routing Problem that appears in Industrial Enterprises," *Expert Systems*.

150. Samorani, M. and M. Laguna (work in progress) "Learning Interpretable Constructive Algorithms."

151. Sánchez-Oro, J., A. Martínez-Gavara, M. Laguna, and R. Martí (work in progress) "A GRASP for Layering in Hierarchical Graph Drawing."

Presentations

Invited

1. *Tabu and Scatter Search: Principles and Practice*, INFORMS Annual Meeting, Phoenix, November 5, 2018

2. *Solving a Parallel Machine Capacitated Lot-Sizing and Scheduling Problem with Shared Resources*, Joint EURO/ALIO International Conference 2018 on Applied Combinatorial Optimization, Bologna, June 27, 2018.

3. *Black-Box Solvers for Combinatorial Optimization*, Metaheuristics International Conference (MIC) and Congreso Español de Metaheurísticas, Algoritmos Evolutivos y Bioinspirados (MAEB), Barcelona, July 6, 2017.

4. *Simulation -Optimization for Strategic Workforce Planning,* INFORMS Annual Meeting, Nashville, November 14, 2016.

5. *Models and Solution Methods for the Uncapacitated r-Allocation p-Hub Center Problem*, 28th European Conference on Operational Research (EURO), Poznan, July 6, 2016.

6. *Scatter Search for the Bandpass Problem,* European Conference on Operational Research (EURO), Glasgow, July 13, 2015.

7. *Heuristic Solution Approaches for the Maximum MinSum Dispersion Problem*, INFORMS Computing Society Conference, Richmond, January 13, 2015.

8. *Heuristic Solution Approaches for the Maximum MinSum Dispersion Problem*, II Workshop on Real Life Optimization (WORLO), Burgos, October 12, 2014.

9. *Meta-Analytics for Improved Heuristic Search in Combinatorial Spaces*, International Federation of Operational Research Societies (IFORS) Conference, Barcelona, July 15, 2014.

10. A Graph Coloring Approach to the Deployment Scheduling and Unit Assignment Problem, ASEPUMA, Málaga, July 11, 2014.

11. *Scatter Search for the Profile Minimization Problem*, INFORMS Computing Society Conference, Santa Fe, January 7, 2013

12. *Modeling and Solving a Cyclic and Batching Scheduling Problem with Two Types of Setups*, University of Burgos, May 18, 2012

13. *Enhanced Decision Making with Black-Box Optimization*, Workshop on Locational Analysis and Related Problems, Granada, Spain, May 10, 2012

14. *The Role of Black-Box Optimization in the Management of Production and Logistics, Second*, Second Workshop on the Implementation of Production Management Systems (WIPMas II), Universidad Politécnica de Valencia, October 17, 2011

15. *Practical Solutions of Optimization Problems*, INFORMS Annual Meeting, Austin, November 9, 2010.

16. *New Developments for Solving Real World Optimization Problems by Marrying Simulation and Optimization*, Tutorial, INFORMS Annual Meeting, Austin, November 10, 2010.

17. *Optimizing Simulations for Decision Making under Uncertainty*, Plenary Speaker, ASEPUMA, Burgos, Spain, September 17, 2009.

18. *Process Improvement via Simulation Optimization*, Third Industrial and Systems Engineering International Conference at Monterrey Tech Morelia, September 19, 2008.

19. *Estimating the Cost of Deploying Teams to Sites in a Reconfiguration Process*, ECCO XXI, Dubrovnik, Croatia, May 30, 2008.

20. *Scatter Search for Combinatorial Optimization: Methodological Advances and Recent Applications*, ECCO XXI, Dubrovnik, Croatia, May 30, 2008.

21. *Testing New Ideas for Metaheuristic Search with the Max-Cut Problem*, University of Texas at Austin, February 1, 2008.

22. *The OptQuest Engine: A Commercial Application of Metaheuristic Optimization*, Keynote Speaker, ICEEE 2007, Mexico City, September 5-7, 2007.

23. *The OptQuest System and its Impact in Industry*, EURO XXII, Prague, July 9-12, 2007.

24. *Round Table on Metaheuristics and Soft Computing,* V Congreso Español sobre Metaheuristicas, Algoritmos Evolutivos y Bioinspirados, Tenerife, Spain, February 13, 2007.

25. *Multiobjective Clustering with Metaheuristic Optimization,* INFORMS Annual Meeting, Pittsburgh, November 5-9, 2006.

26. *Multiobjective Clustering via Metaheuristic Optimization: An Application to Market Segmentation*, University of Málaga, June 27, 2006.

27. *Simulation Optimization with OptQuest,* Monterrey Institute of Technology, November 1, 2005.

28. *Tabu Search,* IV Congreso Español sobre Metaheuristicas, Algoritmos Evolutivos y Bioinspirados, Granada, Spain, September 13, 2005.

29. *Practical Introduction to Simulation Optimization,* Fraunhofer Institute of Dortmund, July 29, 2005.

30. *Introducción Práctica a la Búsqueda Dispersa y su Aplicación a la Optimización de Modelos de Simulación,* Universidad de Burgos, May 24, 2005.

31. *Scatter Search and Path Relinking: Methodology and Applications*, University of Iowa, February 4, 2005.

32. *OptQuest: Global Optimization Software Based on Metaheuristic Technology*, 9th ICS Conference, Annapolis, January 5-7, 2005.

33. *Scatter Search and Path Relinking: Methodology and Applications*, XIV Congreso Nacional de Actuaría, Puebla, México, September 7-10, 2004,

34. *An Exploration of Metaheuristic Optimization: Tabu Search, Scatter Search and Path Relinking*, Congreso Colombiano de Investigación de Operaciones, Cartagena, March 15-19, 2004.

35. *Selection and Assignment of a Skilled Workforce to Meet Job Requirements in a Fixed Planning Period*, III Congreso Español sobre Metaheuristicas, Algoritmos Evolutivos y Bioinspirados, Córdoba, Spain, February 4-6, 2004.

36. *Practical Introduction to Simulation Optimization,* Winter Simulation Conference, New Orleans, December 7-10, 2003.

37. *Capacity Expansion of WDM Networks Under Demand Uncertainty*, INFORMS Annual Meeting, Atlanta, October 19-22, 2003.

38. *Scatter Search: Methodology and Implementations in C*, II Congreso Español sobre Metaheuristicas, Algoritmos Evolutivos y Bioinspirados, Gijón, Spain, February 5-7, 2003.

39. *Scatter Search: Methodology and Applications*, 8th INFORMS Computing Society Conference, Phoenix, January 8-10, 2003.

40. *Object-Oriented Metaheuristic Optimization with OptQuest,* INFORMS Annual Meeting, San Jose, November 17-20, 2002.

41. *OptTek Systems & Optimal Methods Create New Optimization Software - OptQuest NLP,* INFORMS Annual Meeting, San Jose, November 17-20, 2002.

42. *Scatter Search: Methodology and Applications*, XI Latin-Iberian American Congress of Operations Research (CLAIO), Concepción, Chile, October 27-31, 2002.

43. *Scatter Search: State of the Art,* Department of Applied Economics, University of Malaga, September 23, 2002.

44. *Ejection Chain Neighborhoods for the Period Routing Problem*, INFORMS Annual Meeting, Miami, November 4-7, 2001.

45. *La Aplicación de Metaheuristicos a Problemas de Logística*, V Congreso Internacional Sudamericano de Ingeniería de Sistemas e Informática (V CISAISI), Arequipa, Perú, October 7-12, 2001.

46. *Metodología Scatter Search y sus Aplicaciones*, V Congreso Internacional Sudamericano de Ingeniería de Sistemas e Informática (V CISAISI), Arequipa, Perú, October 7-12, 2001.

47. *Lessons from Applying and Experimenting with Scatter Search,* 1st Conference on Adaptive Memory and Evolution: Tabu Search and Scatter Search, Oxford, Mississippi, March 8-10, 2001.

48. *New Methods and Computational Results for Combinatorial Optimization Problems,* 14th Conference of the European Chapter on Combinatorial Optimization (ECCO XIV), Bonn, Germany, May 30 – June 2, 2001.

49. *An Exploration of Metaheuristic Optimization: Tabu Search and Scatter Search,* Cours/Séminaire du 3e Cycle Romand de Recherche Opérationnalle, Lac Noir, Switzerland, March 2000.

50. *Tutorial: New Advances Combining Optimization and Simulation*, INFORMS Philadelphia, November 1999.

51. *Optimization of Simulated Systems: A Telecommunication Application*, III Congreso Internacional Sudamericano de Ingeniería de Sistemas e Informática, Cochabamba, Bolivia, October 1999.

52. *Introduction to Metaheuristics: Tabu Search and Scatter Search,* DIMACS, Rutgers University, April 1999.

53. *Tabu Search with Path Relinking for the Linear Ordering Problem,* INFORMS Seattle, October 1998.

54. *GRASP and Path Relinking for Two-Layer Straight Line Crossing Minimization,* Sixth INFORMS Computer Science Technical Section Conference, Monterey, January 1998.

55. *Combining Risk Analysis and Optimization with Scatter Search,* INFORMS Dallas, October 1997.

56. *Technology Advances in the Field of Modeling,* Eli Lilly and Company Global Manufacturing and Development Computational Modeling Conference, Indianapolis, October 1997.

57. *Resource Scheduling with Stochastic Job Interruptions,* Metaheuristics International Conference II, Sophia-Antipolis, July 1997.

58. *Tutorial: Metaheuristics,* EURO / INFORMS Joint International Meeting, Barcelona, July 1997.

59. *Cut Search and Star Path Methods,* EURO / INFORMS Joint International Meeting, Barcelona, July 1997.

60. *A Robust Scheduling Model for Resource-Constrained Scheduling,* INFORMS San Diego, May 1997.

61. *Some Relative Performance Efficiency Evaluation Problems and Models in a Telecommunication Company,* INFORMS San Diego, May 1997.

62. *Production Scheduling and Inventory Control in the Presence of Sequence-Dependent Setup Times,* INFORMS San Diego, May 1997.

63. *Robust Optimization and Strategy Development,* INFORMS San Diego, May 1997.

64. *Tutorial: Tabu Search for Discrete, Nonlinear and Stochastic Optimization,* INFORMS San Diego, May 1997.

65. *Searching for Optimal Algorithm Parameters,* INFORMS San Diego, May 1997.

66. *New Advances and Applications of Combining Simulation and Optimization,* Winter Simulation Conference, San Diego, 1996.

67. *A Scatter Search / Tabu Search Approach to Optimize Simulated Production Scheduling Systems*, INFORMS Atlanta, Fall 1996.

68. *Arc Crossing Minimization in Graphs with Tabu Search,* INFORMS Washington, Spring 1996.

69. *Tutorial: Tabu Search and Its Real World Applications,* INFORMS New Orleans, Fall 1995.

70. *Heuristics for Controlling, Routing and Scheduling,* INFORMS New Orleans, Fall 1995.

71. *Heuristics for the Optimal Control of Thermal Energy Storage,* Metaheuristics International Conference I, Breckenridge, July 1995.

72. *Tutorial: Heuristic-Based Optimization,* INFORMS International, Singapore, June 1995.

73. *A New Approach to the MRP Capacitated Problem,* INFORMS International, Singapore, June 1995.

74. *Tutorial: Tabu Search,* II Escuela de Verano Latino-Americana de Investigación Operativa, Rio de Janeiro, January 1995.

75. *A Greedy Randomized Adaptive Search Heuristic for the* 2-*Partition Problem,* Second International Colloquium on Graphs and Optimization, Leukerbad, Switzerland, August 1994.

76. *Methods and Strategies for Robust Combinatorial Optimization,* Operations Research 94, Berlin, August 1994.

77. *Master Production Scheduling in a Single Facility with Sequence-Dependent Changeover Times,* TIMS XXXII, Anchorage, June 1994.

78. *Productive Metaheuristic Links — Tabu Search, Genetic Algorithms and Neural Networks,* TIMS XXXII, Anchorage, June 1994.

79. *New Approaches to Master Production Planning Integrating AI and OR,* ORSA/TIMS Joint National Meeting, Phoenix, November 1993.

80. 2-*Partition of a Graph Using GRASP,* ORSA/TIMS Joint National Meeting, Phoenix, November 1993.

81. *Tutorial: AI-Related Heuristics and Applications,* XIII World Conference on Operations Research (IFORS 93), Lisbon, Portugal, July 1993.

82. *Designing Synchronous Optical Network Rings for Interoffice Telecommunications,* ORSA/TIMS Joint National Meeting, San Francisco, November 1992.

83. *Combining Tabu Search and the Generalized Assignment Heuristic in Solving Vehicle Routing Problems,* ORSA/TIMS Joint National Meeting, San Francisco, November 1992.

84. *Using Neural Networks for Target Analysis,* ORSA/TIMS Joint National Meeting, San Francisco, November 1992.

85. *Update on Tabu Search in Scheduling,* ORSA/TIMS Joint National Meeting, San Francisco, November 1992.

86. *Tabu Search,* Foundations of Genetic Algorithms (FOGA), Vail, July 1992.

87. *Tutorial: Artificial Intelligence and Optimization,* TIMS/ORSA Joint National Meeting, Orlando, April 1992.

88. *Applying Tabu Search to Statistical Physics,* ORSA Computer Science Technical Section Conference, Williamsburg, January 1992.

89. *A Simulated Annealing Method with Tabu Search Memory Functions,* ORSA/TIMS Joint National Meeting, Anaheim, November 1991.

90. *On Solving Difficult Generalized Assignment Problems,* ORSA/TIMS Joint National Meeting, Anaheim, November 1991.

91. *Bandwidth Packing: A Tabu Search Approach,* The First Workshop on Combinatorial Optimization in Science and Technology, DIMACS Technical Report 91-18, RUTCOR Report 3-91, April 2-6, 1991.

92. *Target Analysis for Improved Decision Rules in Group Decision Making,* ORSA/TIMS Joint National Meeting, New York, October 1989.

93. *Least Cost Scheduling Using Tabu Search,* Manufacturing Management in the Nineties, University of Toledo, April 1989.

Contributed

94. *Grouping Products to Optimize Production Processes,* 17th International Conference on Operations Research (KOI 2018), Zadar, September 27, 2018.

95. *Scatter Search for the Bandpass Problem,* 27th European Conference on Operational Research (EURO 2015), Glasgow, July 13, 2015.

96. *Adpative Sampling and OptQuest for Expensive Black-Box Optimization*, VIII Congreso Español sobre Metaheuristicas, Algoritmos Evolutivos y Bioinspirados (MAEB), Albacete, Spain, February 8, 2012.

97. *A Hybrid Meta-heuristic for the Traveling Salesman Problem with Profits*, MOPGP'06, Tours, France, June 13, 2006.

98. *Modeling and Solving a Selection and Assignment Problem*, 9th ICS Conference, Annapolis, January 5-7, 2005.

99. *Tutorial: New Advances Combining Optimization and Simulation,* 4th International EUROSIM Congress, Delft, The Netherlands, June 26-29, 2001.

100. *Approximation Procedures for Multiobjective Scheduling of School Buses,* 8th International Conference on Computer-Aided Scheduling of Public Transport, Berlin, Germany, June 21-23, 2000.

101. *A Branch and Logic Cut Framework for the Generalized Assignment Problem with Tabu Starting Solutions,* INFORMS Philadelphia, November 1999.

102. *OPTQUEST/GRG: Combining Scatter Search and GRG for Global Optimization,* INFORMS Philadelphia, November 1999.

103. *Project Scheduling with Stochastic Job Interruptions,* EURO / INFORMS Joint International Meeting, Barcelona, July 1997.

104. *Teaching in Different Cultures: A Comparison of Business Education in the Hispanic World and the United States*, The Business Association for Latin American Studies (BALAS) Conference, Monterrey, Mexico, March 1996.

105. *Solving Facility Layout Problems Using Diversification Search,* TIMS/ORSA Joint National Meeting, Nashville, May 1991.

106. *Heuristic Methods for Parallel and Serial Production Scheduling,* ORSA/TIMS Joint National Meeting, Philadelphia, October 1990.

107. *On Target Analysis and Diversification in Tabu Search,* TIMS/ORSA Joint National Meeting, Las Vegas, May 1990.

Awards, Grants and Scholarships

1. MediaOne Professor of Management Science, August 2007 – present.

2. Co-Investigator, "Smart Electricity Solutions," IBM SUR (Shared University Research) Award, 2-year summer funding of $40,000, May 2010.

3. Co-Investigador, Ministerio de Ciencia e Innovación, Spain, Project no. TIN2008-06872-C04-01/TIN, 3-year funding of €59,000, January 1, 2009.

4. Co-Investigador, Ministerio de Ciencia e Innovación, Spain, Project no. ECO2008-06159/ECON, 3-year funding of €72,000, January 1, 2009.

5. Principal Investigator, "OptForce: Optimizing Naval Manpower Planning," Office of Naval Research, $48,000, June-July, 2007.

6. Co-Investigador, Ministerio de Educación y Ciencia, Spain, Project no. SEJ2005-08923/ECON, 1-year funding of €39,600, October 2005.

7. Co-Investigador, Ministerio de Educación y Ciencia, Spain, Project no. TIN2005-08404-C04-03, 1-year funding of €95,000, September 2005.

8. Co-Principal Investigator, "Application of a BIP Constrained Optimization Model to Select the Most Cost-Effective Space Missions to Implement the President's Space Exploration and Utilization Initiative," NASA Subcontract IAC-05-IAA.D3.1.09, 6-month funding of $48,000, April – October 2005

9. Co-Investigator, Office of Naval Research, 1-year funding of $236,467, October 1, 2001 – September 30, 2002

10. Co-Investigator, Environmental Protection Agency Research Grant, 2-year funding of $200,000, January 1, 2001 – December 31, 2002.

11. University of Colorado, Real Estate Center, Competitive Research Grant, Summer 2001

12. Visiting Scholar Grant, University of Valencia (Spain), February – June, 2000

13. University of Colorado, Competitive Research Grant, Summer 1999

14. Charles Guiney Research Scholar, September 1998 - May 2000

15. Visiting Scholar Grant, Government of Valencia (Spain), Summer 1996

16. University of Colorado, Competitive Research Grant, Summer 1995

17. University of Colorado, Competitive Research Grant, Summer 1994

18. Procter and Gamble de México, scholarship to participate in the 1986 International Marketing Seminar, Mexico City

19. Honor Student Award, Monterrey Tech at Querétaro, 1981

20. Scholarship for tuition and fees, Monterrey Tech at Querétaro, 1978

Doctoral Dissertation Advisor or Co-advisor

1. Simulation-Optimization, Markov Chain and Graph Coloring Approaches to Military Manpower Modeling and Deployment Sourcing, Mark Zais, University of Colorado Boulder, 2014.

2. Data Mining for Enhanced Operations Management Decision Making: Applications in Health Care, Michele Samorani, University of Colorado Boulder, 2012.

3. Data Mining Techniques for Prediction and Classification in Discrete Data Applications, Marco Better, University of Colorado Boulder, 2007.

4. Optimización Metaheurística para la Planificación de Redes WDM, María Belén Melián Batista, Universidad de La Laguna, 2003

5. Uso de Optimización de Simulaciones y Estrategias Metaheurísticas en la Planificación de Turnos de Personal en un Aeropuerto, Silvia Casado Yusta, Universidad de Burgos, 2003.

6. Heuristics Based on Mixed-Integer and Constraint Programming for a Class of Time Constrained Routing and Scheduling Problems, Gyungwon Jung, University of Colorado Boulder, 2003

7. Making Long-Run Predictions from Short-Run Data: Using Transition Trees to Improve Forecasting Accuracy, Kerrie Paige, University of Colorado Boulder, 1999.

8. Multiple Resource Planning and Allocation in Resource-Constrained Project Networks, Balasubramanian Rangaswamy, University of Colorado Boulder, 1998

9. Minimizing Maximum Regret for Linear Programs with Interval Objective Function Coefficients, Helmut Mausser, University of Colorado Boulder, 1997

Principal Research Areas

1. Development of models and solution methods for combinatorial optimization and decision problems under uncertainty

2. Metaheuristic optimization and the interface between operations research, computer science and artificial intelligence

3. Simulation optimization

Editorial Work

1. Annals of Operations Research (Guest Editor)

2. European Journal of Operational Research (Guest Editor)

3. clm.economía (Comité Científico)

4. Journal of Heuristics (Editor in Chief)

5. Journal of the Operational Research Society (International Advisory Board)

6. Operations Research Perspectives (Editorial Board)

Professional Associations

Membership

1. Asociación Latino-Americana de Investigación Operativa

2. Beta Gamma Sigma

3. Institute for Operations Research and the Management Sciences

4. International Honor Society Omega Rho

Organization of Conferences and Workshops

5. *Program Committee Chair,* Joint XVII Latin-Iberian-American Conference on Operations Research (CLAIO) and III Conference of the Mexican Society of Operations Research, October 6-10, 2014, Monterrey.

6. *Co-Organizer,* Workshop on Real-Life Optimization, October 21-22, 2011, Málaga

7. *General Chair*, INFORMS Annual Meeting, October 24-27, 2004, Denver

8. *General Co-Chair,* 7th INFORMS Computing Society Conference, January 3-5, 2000, Cancun

Courses Taught

Leeds School of Business, University of Colorado Boulder

1. *Advanced Operations Management Modeling* (PhD)

2. *Business Logistics Management* (Undergraduate and MBA)

3. *Decision Modeling and Applications* (Undergraduate and MBA)

4. *Discrete Optimization* (PhD)

5. *Fundamentals of Business Statistics* (Undergraduate)

6. *Managing Business Processes* (Undergraduate and MBA)

7. *Operations Management / Competing with Operations* (Undergraduate)

8. *Optimization Modeling* (MS)

9. *Proseminar in Operations and Information Management* (PhD)

10. *Quantitative Methods* (MBA)

11. *Supply Chain Management* (Undergraduate)

12. *Survey of Business Analytics* (MS)

13. *Total Quality Management* (Undergraduate and MBA)

Mechanical Engineering Department, University of Texas at Austin

14. *Basic Industrial Engineering* (Undergraduate)

15. *Probability and Statistics* (Undergraduate)