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### **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*, Operations Management, 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 Chancellor, 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 Potosí, January 1983 — December 1983

## Business Experience

*Advisory Board*, Better Business Analytics (<https://www.bettersolv.com/>), Boulder, Colorado, October 2022 – present.

*Technology Advisory Board*, OGA (<https://www.oga.ai/en/>), Seville, Spain, July 2022 – present.

*Co-founder*, OptTek Systems, Inc. (<https://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. Cavero, S., E. G. Pardo, A. Duarte, and M. Laguna (2021) "Multistart Search for the Cyclic Cutwidth Minimization Problem," *Computers & Operations Research*, vol. 126, 105116.

2.     García-Heredia, D., A. Alonso-Ayuso, M. Laguna, and E. Molina (2021) "A Solution Method for the Shared Resource Constrained Multi-Shortest Path Problem," *Expert Systems with Applications*, vol. 182, 115193.
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4.     López-Sánchez, A. D., J. Sánchez-Oro, and M. Laguna (2021) "A New Scatter Search Design for Multiobjective Combinatorial Optimization with an Application to Facility Location," *INFORMS Journal on Computing*, vol. 33, no. 2, pp. 629-642.
5.     Casado, S., M. Laguna, J. Pacheco, and J. C. Puche (2020) "Grouping Products to Optimize Production Processes: A Case in the Steel Manufacturing Industry," *European Journal of Operational Research*, vol. 286, no. 1, pp. 190-202.
6.     De Armas, J. and M. Laguna (2020) "Parallel Machine, Capacitated Lot-Sizing and Scheduling for the Pipe-Insulation Industry," *International Journal of Production Research*, vol. 58, no. 3, pp. 800-817.
7.     Delgado-Antequera, L., M. Laguna, J. Pacheco, and R. Caballero (2020) "A Bi-Objective Solution Approach to a Real-World Waste Collection Problem," *Journal of the Operational Research Society*, vol. 71, no. 2, pp. 183-194.
8.     Pacheco, J. and M. Laguna (2020) "Vehicle Routing for the Urgent Delivery of Face Shields During the COVID-19 Pandemic," *Journal of Heuristics*, vol. 26, no. 5, pp. 619-635.
9.     Peiró, J., A. Corbarán, M. Laguna, and R. Martí (2018) "Models and Solution Methods for the Uncapacitated  $r$ -Allocation  $p$ -Hub Equitable Center Problem," *International Transactions in Operations Research*, vol. 25, no. 4, pp. 1241-1267.
10.    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.
11.    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.
12.    Zais, M. and M. Laguna (2017) "A Simulation-Optimization Approach to Estimate Workforce Requirements," *Military Operations Research*, vol. 22, no. 1, pp. 19-37.

13. 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.
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15. 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.
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17. 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.
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74. 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.
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83. 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.

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87. 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.
88. Laguna, M. (1994) "A Guide to Implementing Tabu Search," *Investigación Operativa*, vol. 4, no. 1, pp. 5-25.
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91. Barnes, J. W. and M. Laguna (1993) "A Tabu Search Experience in Production Scheduling," *Annals of Operations Research*, vol. 41, pp. 141-156.
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101. Duarte, A., M. Laguna, and R. Martí (2018) *Metaheuristics for Business Analytics: A Decision Modeling Approach*, Springer: Switzerland, ISBN: 2364-678X, 136 pp.
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117. 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.
118. 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.
119. 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.
120. 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.

121. 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.
122. 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.
123. 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.
124. 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.
125. 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.
126. 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.
127. Adenso-Díaz, B., F. Glover and M. Laguna (1997) "New Search Heuristics for Decision Making," in *Expert Information Systems*, A. Zimitrovich, Tetrasistemas, Minsk, pp. 281-360. In Russian.
128. 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.
129. 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

130. 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 Metaheurísticas, Algoritmos Evolutivos y Bioinspirados (MAEB)*, A. Duarte and J. I. Hidalgo (Eds.), Madrid (Spain), pp. 773-781.
131. 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 Metaheurísticas, Algoritmos Evolutivos y Bioinspirados* (MAEB), A. Duarte and J. I. Hidalgo (Eds.), Madrid (Spain), pp. 842-851.
132. Laguna, M. (2012) "Adaptive Sampling and OptQuest for Expensive Black-Box Optimization," *Proceedings of the VIII Congreso Español sobre Metaheurísticas, 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
  133. 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.
  134. 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.
  135. 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.
  136. 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.
  137. 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.
  138. 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.
  139. 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.
  140. Laguna, M. (1995) "Methods and Strategies for Robust Combinatorial Optimization," *Operations Research Proceedings 1994*, U. Derigs, A. Bachem, and A. Drexel (Eds.), Springer-Verlag, Berlin Heidelberg, pp. 103-108.

#### Un-refereed Proceedings and Electronic Publications

141. 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>.
142. 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.
143. Laguna, M. (1998) "Optimization of Complex Systems with OptQuest," *Decisioneering*, <http://www.decisioneering.com/optquest/complexsystems.html>.
144. 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

145. 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.
146. 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.
147. 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.
148. Glover, F., M. Laguna, E. Taillard, and D. de Werra (1993) "Tabu Search," *Annals of Operations Research*, vol. 41.

#### Software Manuals

149. Evans, J. and M. Laguna (1998) "OptQuest for Crystal Ball User Manual," *Crystal Ball Pro*, Decisioneering.
150. 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

151. 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

152. Calvete, H. I., C. Galé, J. A. Iranzo, and M. Laguna (work in progress) "A scatter search approach with path relinking for solving linear bilevel problems."
153. Colmenar, J. M., M. Laguna, R. Martín-Santamaría (work in progress) "Changeover minimization in the production of metal parts for car seats."
154. Laguna, M., S. Cavero-Díaz, and E. García-Pardo (revise and resubmit) "Solving a short sea inventory routing problem in the oil industry," *Computers & Industrial Engineering*.
155. Laguna, M., R. Martí, A. Martínez-Gavara, S. Pérez-Peló, M. G. C. Resende (submitted) "20 years of greedy randomized adaptive search procedures with path relinking," *European Journal of Operational Research*.
156. Martín-Santamaría, R., A. Martínez-Gavara, A. D. López-Sánchez, and M. Laguna (submitted) "Multiparent path relinking. An application to the power dominating set problem," *Mathematical Programming Computation*.
157. Nenova, Z., M. Laguna, and D. Zhang (work in progress) "Approximate dynamic programming for a dynamic appointment scheduling problem."
158. Sánchez-Oro, J. and M. Laguna (work in progress) "Parallel scatter search and path relinking for combinatorial optimization."

## Presentations

### Invited

1. *Inventory routing problems in the oil industry*, III Congreso Grupo CÁTEDRA, OGA Seville, January 17-18, 2024.
2. *Lessons from lotsizing and scheduling parallel nonidentical production lines in manufacturing plants*, II Congreso Grupo CÁTEDRA, OGA Seville, June 29-30, 2023.
3. *Are we solving the right problem? The road from problem definition to usable solutions*, I Congreso Grupo CÁTEDRA, OGA Seville, October 6-7, 2022.
4. *Scatter Search Applications in Logistics*, Universidad de Pablo Olavide, Seville, January 20, 2022.



5. *On How Scatter Search has been Adapted to Tackle Multiobjective Optimization Problems*, XIII Reunión del Grupo Español de Decisión Multicriterio (GEDM), San Sebastián, July 23, 2021 (Pleanary).
6. *Tabu and Scatter Search: Principles and Practice*, INFORMS Annual Meeting, Phoenix, November 5, 2018 (Tutorial).
7. *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.
8. *Black-Box Solvers for Combinatorial Optimization*, Metaheuristics International Conference (MIC) and Congreso Español de Metaheurísticas, Algoritmos Evolutivos y Bioinspirados (MAEB), Barcelona, July 6, 2017.
9. *Simulation -Optimization for Strategic Workforce Planning*, INFORMS Annual Meeting, Nashville, November 14, 2016.
10. *Models and Solution Methods for the Uncapacitated  $r$ -Allocation  $p$ -Hub Center Problem*, 28<sup>th</sup> European Conference on Operational Research (EURO), Poznan, July 6, 2016.
11. *Scatter Search for the Bandpass Problem*, European Conference on Operational Research (EURO), Glasgow, July 13, 2015.
12. *Heuristic Solution Approaches for the Maximum MinSum Dispersion Problem*, INFORMS Computing Society Conference, Richmond, January 13, 2015.
13. *Heuristic Solution Approaches for the Maximum MinSum Dispersion Problem*, II Workshop on Real Life Optimization (WORLO), Burgos, October 12, 2014.
14. *Meta-Analytics for Improved Heuristic Search in Combinatorial Spaces*, International Federation of Operational Research Societies (IFORS) Conference, Barcelona, July 15, 2014.
15. *A Graph Coloring Approach to the Deployment Scheduling and Unit Assignment Problem*, ASEPUMA, Málaga, July 11, 2014.
16. *Scatter Search for the Profile Minimization Problem*, INFORMS Computing Society Conference, Santa Fe, January 7, 2013
17. *Modeling and Solving a Cyclic and Batching Scheduling Problem with Two Types of Setups*, University of Burgos, May 18, 2012
18. *Enhanced Decision Making with Black-Box Optimization*, Workshop on Locational Analysis and Related Problems, Granada, Spain, May 10, 2012

19. *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
20. *Practical Solutions of Optimization Problems*, INFORMS Annual Meeting, Austin, November 9, 2010.
21. *New Developments for Solving Real World Optimization Problems by Marrying Simulation and Optimization*, Tutorial, INFORMS Annual Meeting, Austin, November 10, 2010.
22. *Optimizing Simulations for Decision Making under Uncertainty*, Plenary Speaker, ASEPUMA, Burgos, Spain, September 17, 2009.
23. *Process Improvement via Simulation Optimization*, Third Industrial and Systems Engineering International Conference at Monterrey Tech Morelia, September 19, 2008.
24. *Estimating the Cost of Deploying Teams to Sites in a Reconfiguration Process*, ECCO XXI, Dubrovnik, Croatia, May 30, 2008.
25. *Scatter Search for Combinatorial Optimization: Methodological Advances and Recent Applications*, ECCO XXI, Dubrovnik, Croatia, May 30, 2008.
26. *Testing New Ideas for Metaheuristic Search with the Max-Cut Problem*, University of Texas at Austin, February 1, 2008.
27. *The OptQuest Engine: A Commercial Application of Metaheuristic Optimization*, Keynote Speaker, ICEEE 2007, Mexico City, September 5-7, 2007.
28. *The OptQuest System and its Impact in Industry*, EURO XXII, Prague, July 9-12, 2007.
29. *Round Table on Metaheuristics and Soft Computing*, V Congreso Español sobre Metaheurísticas, Algoritmos Evolutivos y Bioinspirados, Tenerife, Spain, February 13, 2007.
30. *Multiobjective Clustering with Metaheuristic Optimization*, INFORMS Annual Meeting, Pittsburgh, November 5-9, 2006.
31. *Multiobjective Clustering via Metaheuristic Optimization: An Application to Market Segmentation*, University of Málaga, June 27, 2006.
32. *Simulation Optimization with OptQuest*, Monterrey Institute of Technology, November 1, 2005.
33. *Tabu Search*, IV Congreso Español sobre Metaheurísticas, Algoritmos Evolutivos y Bioinspirados, Granada, Spain, September 13, 2005.

34. *Practical Introduction to Simulation Optimization*, Fraunhofer Institute of Dortmund, July 29, 2005.
35. *Introducción Práctica a la Búsqueda Dispersa y su Aplicación a la Optimización de Modelos de Simulación*, Universidad de Burgos, May 24, 2005.
36. *Scatter Search and Path Relinking: Methodology and Applications*, University of Iowa, February 4, 2005.
37. *OptQuest: Global Optimization Software Based on Metaheuristic Technology*, 9<sup>th</sup> ICS Conference, Annapolis, January 5-7, 2005.
38. *Scatter Search and Path Relinking: Methodology and Applications*, XIV Congreso Nacional de Actuaría, Puebla, México, September 7-10, 2004,
39. *An Exploration of Metaheuristic Optimization: Tabu Search, Scatter Search and Path Relinking*, Congreso Colombiano de Investigación de Operaciones, Cartagena, March 15-19, 2004.
40. *Selection and Assignment of a Skilled Workforce to Meet Job Requirements in a Fixed Planning Period*, III Congreso Español sobre Metaheurísticas, Algoritmos Evolutivos y Bioinspirados, Córdoba, Spain, February 4-6, 2004.
41. *Practical Introduction to Simulation Optimization*, Winter Simulation Conference, New Orleans, December 7-10, 2003.
42. *Capacity Expansion of WDM Networks Under Demand Uncertainty*, INFORMS Annual Meeting, Atlanta, October 19-22, 2003.
43. *Scatter Search: Methodology and Implementations in C*, II Congreso Español sobre Metaheurísticas, Algoritmos Evolutivos y Bioinspirados, Gijón, Spain, February 5-7, 2003.
44. *Scatter Search: Methodology and Applications*, 8<sup>th</sup> INFORMS Computing Society Conference, Phoenix, January 8-10, 2003.
45. *Object-Oriented Metaheuristic Optimization with OptQuest*, INFORMS Annual Meeting, San Jose, November 17-20, 2002.
46. *OptTek Systems & Optimal Methods Create New Optimization Software - OptQuest NLP*, INFORMS Annual Meeting, San Jose, November 17-20, 2002.
47. *Scatter Search: Methodology and Applications*, XI Latin-Iberian American Congress of Operations Research (CLAIO), Concepción, Chile, October 27-31, 2002.
48. *Scatter Search: State of the Art*, Department of Applied Economics, University of Malaga, September 23, 2002.

49. *Ejection Chain Neighborhoods for the Period Routing Problem*, INFORMS Annual Meeting, Miami, November 4-7, 2001.
50. *La Aplicación de Metaheurísticos a Problemas de Logística*, V Congreso Internacional Sudamericano de Ingeniería de Sistemas e Informática (V CISAISI), Arequipa, Perú, October 7-12, 2001.
51. *Metodología Scatter Search y sus Aplicaciones*, V Congreso Internacional Sudamericano de Ingeniería de Sistemas e Informática (V CISAISI), Arequipa, Perú, October 7-12, 2001.
52. *Lessons from Applying and Experimenting with Scatter Search*, 1<sup>st</sup> Conference on Adaptive Memory and Evolution: Tabu Search and Scatter Search, Oxford, Mississippi, March 8-10, 2001.
53. *New Methods and Computational Results for Combinatorial Optimization Problems*, 14<sup>th</sup> Conference of the European Chapter on Combinatorial Optimization (ECCO XIV), Bonn, Germany, May 30 – June 2, 2001.
54. *An Exploration of Metaheuristic Optimization: Tabu Search and Scatter Search*, Cours/Séminaire du 3<sup>e</sup> Cycle Romand de Recherche Opérationnelle, Lac Noir, Switzerland, March 2000.
55. *Tutorial: New Advances Combining Optimization and Simulation*, INFORMS Philadelphia, November 1999.
56. *Optimization of Simulated Systems: A Telecommunication Application*, III Congreso Internacional Sudamericano de Ingeniería de Sistemas e Informática, Cochabamba, Bolivia, October 1999.
57. *Introduction to Metaheuristics: Tabu Search and Scatter Search*, DIMACS, Rutgers University, April 1999.
58. *Tabu Search with Path Relinking for the Linear Ordering Problem*, INFORMS Seattle, October 1998.
59. *GRASP and Path Relinking for Two-Layer Straight Line Crossing Minimization*, Sixth INFORMS Computer Science Technical Section Conference, Monterey, January 1998.
60. *Combining Risk Analysis and Optimization with Scatter Search*, INFORMS Dallas, October 1997.
61. *Technology Advances in the Field of Modeling*, Eli Lilly and Company Global Manufacturing and Development Computational Modeling Conference, Indianapolis, October 1997.

62. *Resource Scheduling with Stochastic Job Interruptions*, Metaheuristics International Conference II, Sophia-Antipolis, July 1997.
63. *Tutorial: Metaheuristics*, EURO / INFORMS Joint International Meeting, Barcelona, July 1997.
64. *Cut Search and Star Path Methods*, EURO / INFORMS Joint International Meeting, Barcelona, July 1997.
65. *A Robust Scheduling Model for Resource-Constrained Scheduling*, INFORMS San Diego, May 1997.
66. *Some Relative Performance Efficiency Evaluation Problems and Models in a Telecommunication Company*, INFORMS San Diego, May 1997.
67. *Production Scheduling and Inventory Control in the Presence of Sequence-Dependent Setup Times*, INFORMS San Diego, May 1997.
68. *Robust Optimization and Strategy Development*, INFORMS San Diego, May 1997.
69. *Tutorial: Tabu Search for Discrete, Nonlinear and Stochastic Optimization*, INFORMS San Diego, May 1997.
70. *Searching for Optimal Algorithm Parameters*, INFORMS San Diego, May 1997.
71. *New Advances and Applications of Combining Simulation and Optimization*, Winter Simulation Conference, San Diego, 1996.
72. *A Scatter Search / Tabu Search Approach to Optimize Simulated Production Scheduling Systems*, INFORMS Atlanta, Fall 1996.
73. *Arc Crossing Minimization in Graphs with Tabu Search*, INFORMS Washington, Spring 1996.
74. *Tutorial: Tabu Search and Its Real World Applications*, INFORMS New Orleans, Fall 1995.
75. *Heuristics for Controlling, Routing and Scheduling*, INFORMS New Orleans, Fall 1995.
76. *Heuristics for the Optimal Control of Thermal Energy Storage*, Metaheuristics International Conference I, Breckenridge, July 1995.
77. *Tutorial: Heuristic-Based Optimization*, INFORMS International, Singapore, June 1995.
78. *A New Approach to the MRP Capacitated Problem*, INFORMS International, Singapore, June 1995.

79. *Tutorial: Tabu Search*, II Escuela de Verano Latino-Americana de Investigación Operativa, Rio de Janeiro, January 1995.
80. *A Greedy Randomized Adaptive Search Heuristic for the 2-Partition Problem*, Second International Colloquium on Graphs and Optimization, Leukerbad, Switzerland, August 1994.
81. *Methods and Strategies for Robust Combinatorial Optimization*, Operations Research 94, Berlin, August 1994.
82. *Master Production Scheduling in a Single Facility with Sequence-Dependent Changeover Times*, TIMS XXXII, Anchorage, June 1994.
83. *Productive Metaheuristic Links — Tabu Search, Genetic Algorithms and Neural Networks*, TIMS XXXII, Anchorage, June 1994.
84. *New Approaches to Master Production Planning Integrating AI and OR*, ORSA/TIMS Joint National Meeting, Phoenix, November 1993.
85. *2-Partition of a Graph Using GRASP*, ORSA/TIMS Joint National Meeting, Phoenix, November 1993.
86. *Tutorial: AI-Related Heuristics and Applications*, XIII World Conference on Operations Research (IFORS 93), Lisbon, Portugal, July 1993.
87. *Designing Synchronous Optical Network Rings for Interoffice Telecommunications*, ORSA/TIMS Joint National Meeting, San Francisco, November 1992.
88. *Combining Tabu Search and the Generalized Assignment Heuristic in Solving Vehicle Routing Problems*, ORSA/TIMS Joint National Meeting, San Francisco, November 1992.
89. *Using Neural Networks for Target Analysis*, ORSA/TIMS Joint National Meeting, San Francisco, November 1992.
90. *Update on Tabu Search in Scheduling*, ORSA/TIMS Joint National Meeting, San Francisco, November 1992.
91. *Tabu Search*, Foundations of Genetic Algorithms (FOGA), Vail, July 1992.
92. *Tutorial: Artificial Intelligence and Optimization*, TIMS/ORSA Joint National Meeting, Orlando, April 1992.
93. *Applying Tabu Search to Statistical Physics*, ORSA Computer Science Technical Section Conference, Williamsburg, January 1992.

94. *A Simulated Annealing Method with Tabu Search Memory Functions*, ORSA/TIMS Joint National Meeting, Anaheim, November 1991.
95. *On Solving Difficult Generalized Assignment Problems*, ORSA/TIMS Joint National Meeting, Anaheim, November 1991.
96. *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.
97. *Target Analysis for Improved Decision Rules in Group Decision Making*, ORSA/TIMS Joint National Meeting, New York, October 1989.
98. *Least Cost Scheduling Using Tabu Search*, Manufacturing Management in the Nineties, University of Toledo, April 1989.

Contributed

99. *Grouping Products to Optimize Production Processes*, 17<sup>th</sup> International Conference on Operations Research (KOI 2018), Zadar, September 27, 2018.
100. *Scatter Search for the Bandpass Problem*, 27<sup>th</sup> European Conference on Operational Research (EURO 2015), Glasgow, July 13, 2015.
101. *Adaptive Sampling and OptQuest for Expensive Black-Box Optimization*, VIII Congreso Español sobre Metaheurísticas, Algoritmos Evolutivos y Bioinspirados (MAEB), Albacete, Spain, February 8, 2012.
102. *A Hybrid Meta-heuristic for the Traveling Salesman Problem with Profits*, MOPGP'06, Tours, France, June 13, 2006.
103. *Modeling and Solving a Selection and Assignment Problem*, 9<sup>th</sup> ICS Conference, Annapolis, January 5-7, 2005.
104. *Tutorial: New Advances Combining Optimization and Simulation*, 4<sup>th</sup> International EUROSIM Congress, Delft, The Netherlands, June 26-29, 2001.
105. *Approximation Procedures for Multiobjective Scheduling of School Buses*, 8<sup>th</sup> International Conference on Computer-Aided Scheduling of Public Transport, Berlin, Germany, June 21-23, 2000.
106. *A Branch and Logic Cut Framework for the Generalized Assignment Problem with Tabu Starting Solutions*, INFORMS Philadelphia, November 1999.
107. *OPTQUEST/GRG: Combining Scatter Search and GRG for Global Optimization*, INFORMS Philadelphia, November 1999.

108. *Project Scheduling with Stochastic Job Interruptions*, EURO / INFORMS Joint International Meeting, Barcelona, July 1997.
109. *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.
110. *Solving Facility Layout Problems Using Diversification Search*, TIMS/ORSA Joint National Meeting, Nashville, May 1991.
111. *Heuristic Methods for Parallel and Serial Production Scheduling*, ORSA/TIMS Joint National Meeting, Philadelphia, October 1990.
112. *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

## Conferences and Workshops

5. *Organizing Committee*, INFORMS Optimization Society Conference, March 23-25, 2018, Denver
6. *Organizer*, Workshop on Innovations in Optimization and Applications (Fred80fest), March 9-10, 2017, Boulder
7. *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.
8. *Co-Organizer*, Workshop on Real-Life Optimization, October 21-22, 2011, Málaga
9. *General Chair*, INFORMS Annual Meeting, October 24-27, 2004, Denver
10. *General Co-Chair*, 7<sup>th</sup> 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 and Financial Analytics II* (Undergraduate business minor)
3. *Business Logistics Management* (Undergraduate and MBA)
4. *Decision Analytics* (Undergraduate)
5. *Decision Modeling and Applications* (MS and MBA)
6. *Discrete Optimization* (PhD)
7. *Fundamentals of Business Statistics* (Undergraduate)
8. *Managing Business Processes* (Undergraduate and MBA)
9. *Operations Management / Competing with Operations* (Undergraduate)
10. *Proseminar in Operations and Information Management* (PhD)
11. *Quantitative Methods* (MBA)
12. *Supply Chain Management* (Undergraduate)
13. *Survey of Business Analytics* (MS)

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

Mechanical Engineering Department, University of Texas at Austin

15. *Basic Industrial Engineering* (Undergraduate)

16. *Probability and Statistics* (Undergraduate)