Celso C. Ribeiro

Department of Computer Science
Catholic University of Rio de Janeiro
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PERSONAL DATA

Home Address: R. Capistrano de Abreu 28, apt. 702, Rio de Janeiro 22271-000, Brazil

Home Voice: +55 (21) 286-0554

Birth Date: November 19, 1954

Marital Status: Married, one child

Nationality: Brazilian

EDUCATION

09/1988 — 09/1990	**Dr. Habil.** in Computer Science Université Paris XIII, France
09/1981 — 10/1983	**Dr. Ing.** in Computer Science École Nationale Supérieure des Télécommunications, Paris, France
01/1979 — 07/1979	**Specialization** in Hydro-Thermal Systems Operation University of Waterloo, Canada
03/1976 — 04/1978	**M.Sc.** in Systems Engineering Federal University of Rio de Janeiro, Brazil
03/1972 — 07/1976	**Electrical Engineer**, concentration in Systems Engineering Catholic University of Rio de Janeiro, Brazil

RESEARCH INTERESTS

Combinatorial optimization, Design and analysis of algorithms, Parallel algorithms, Parallel computing environments, Heuristic search, Metaheuristics, Mathematical programming, Graphs and networks.

EXPERIENCE AND JOB HISTORY

08/2000 — present   **Visiting Researcher**, AT&T Labs Research, Information Sciences Research Center

10/1983 — present   **Full Professor**, Catholic University of Rio de Janeiro, Brazil

- *Chairman*, Department of Computer Science (03/1993 – 03/1995)
- *Chairman*, Department of Electrical Engineering (03/1985 – 03/1989)
- *Full Professor*, Department of Computer Science (10/1994 – present)
- *Associate Professor*, Department of Computer Science (07/1991 – 09/1994)
- *Associate Professor*, Department of Electrical Engineering (04/1988 – 06/1991)
- *Assistant Professor*, Department of Electrical Engineering (10/1983 – 03/1988)
- *Lecturer*, Department of Electrical Engineering (08/1978 – 9/1983)

04/1994 — present   **Scientific Consultant**, PETROBRAS - Brazil Oil, Human Resources Division, Brazil

01/1996 — **Visiting Scholar**, International Computer Science Institute, UC at Berkeley, USA
03/1996

06/1992 — **Visiting Professor**, Université Paris VI (Laboratoire MASI), France
08/1992

01/1990 — **Visiting Professor**, Université de Montréal, Département de Mathématiques Appliquées,
06/1991 Canada

08/1977 — **Senior Engineer**, ELETROBRAS - Brazilian State Power Board, Rio de Janeiro, Brazil
10/1983

05/1979 — **Visiting Researcher**, IREQ - Institut de Recherche de l'Hydro-Québec, Montréal, Canada
07/1979

ACADEMIC AWARDS

08/1986 — **Research Fellowship**, Brazilian National Council for Science and Technology (CNPq)
present

07/1981 — **Doctorate Fellowship**, Brazilian National Council for Science and Technology (CNPq)
10/1983

08/1976 — **M.Sc. Fellowship**, Brazilian National Council for Science and Technology (CNPq)
07/1977

PROFESSIONAL ACTIVITIES

Member of the *Brazilian Academy of Sciences* (1998 –)

Vice-President of the *International Federation of Operational Research Societies* (1998 – 2001)

President of the *Latin-American Association of Operations Research Societies* (1992 – 1994)

President of the *Brazilian Operations Research Society* (1989 – 1991)

Regional Editor of *International Transactions in Operatoional Research* (2000 – present)

Co-Editor in Chief of *Investigación Operativa* (1991 – 2000)

Associate Editor of *SIAM Monographs on Discrete Mathematics and Applications* (1996 – present)

Associate Editor of *Pattern Recognition* (1990 – present)

Associate Editor of *Journal of Heuristics* (1994 – present)

Associate Editor of *Mathematics of Industrial Systems* (1993 – present)

Associate Editor of *Journal of the Brazilian Computing Society* (1993 – present)

Appointed Member of the *Action Concertée Incitative sur la Globalisation des Ressources Informatiques et des Données* of the French Ministry of Research (2001 – present)

Appointed Member of the Computer Science Committee of the Brazilian National Council for Science and Technology (CNPq) (1994 – 1997)

Joint Coordinator of the Computer Science Committee of the Brazilian Ministry of Education (CAPES) (1999 – present)

General Co-Chairman (with Robert Abrams) of the *TIMS XXX International Meeting* (sponsored by the Institute of Management Sciences), Rio de Janeiro, Brazil (1991)

Chairman and Organizer of Programming Society), Rio de Janeiro, Brazil (1988)

Chairman and Organizer of the *2nd ELAVIO - Latin-American Summer School on Operations Research* (sponsored by the Latin-American Association of Operations Research Societies), Mendes, Brazil (1995)

Chairman of the *III Metaheuristics International Conference (MIC'99)*, Angra dos Reis, Brazil (1999)

Chairman and Organizer of the *XXII Brazilian Symposium on Operations Research* (sponsored by the Brazilian Society of Operations Research), Fortaleza, Brazil (1989)

Cluster Chair of "Combinatorial Optimization" for the *TIMS XXXII International Meeting*, Anchorage (1994)

Cluster Chair of "Combinatorial Optimization" for the *INFORMS National Meeting*, Dallas (1997)

Referee for Operations Research, Networks, Discrete Applied Mathematics, Journal of Heuristics, Annals of Discrete Mathematics, Mathematics of Operations Research, European Journal of Operational Research, International Journal of Flexible Manufacturing Systems, Journal of Parallel and Distributed Computing, Parallel Computing, Annals of Operations Research, Journal of Global Optimization, Pattern Recognition, Mathematics of Industrial Systems, Journal of Classification, Transportation Science, RAIRO Operations Research, Computational Optimization and Applications, IIE Transactions, OR Spektrum, Investigación Operativa, Journal of Advanced Transportation, International Transactions in Operational Research, INFOR - Information Systems and Operations Research, TSI - Techniques et Science Informatique.

Coordinator of international scientific cooperation programs involving the Catholic University of Rio de Janeiro and the following universities and research centers:

- Université de Versailles (Laboratoire PRISM), France (1996 – present)

- Université de Clermont-Ferrand (ISIMA), France (1996 – 1998)

- Université de Versailles (Laboratoire MASI), France (1994 – 1996)

- École Polytechnique de Montréal (Département de Mathématiques Appliquées), Canada (1992 – 1994)

- Université de Grenoble (Laboratoire ARTEMIS), France (1991– 1995)

- Université de Montréal (Département d'Informatique et Recherche Opérationnelle), Canada (1989 – 1990)

- Université Paris VI (Laboratoire MASI), France (1989 – 1991)

- Université Paul Sabatier (LAAS), France (1988 – 1989)

- Centre National d'Études des Télécommunications, France (1985 – 1988)

Member of the Program Committee for IRREGULAR'98 - 5th International Symposium on Solving Irregularly Structured Problems in Parallel, Berkeley (1998)

Member of the Scientific Committee for the Deuxièmes Rencontres Francophones de Recherche Opérationnelle, Tunis, Tunisia (1998)

Member of the Program Committee for IFORS'96 - XIV World Conference on Operations Research, representing the Latin-American Association of Operations Research Societies, Vancouver, Canada (1996)

Member of the Scientific Committee for the Rencontres Francophones de Recherche Opérationnelle, Mons, Belgium (1995)

Member of the Organizing Committee for the TIMS XXXII International Meeting, representing the Brazilian Society of Operations Research, Anchorage (1994)

Member of the Program Committee for the VII Congreso Latino-Ibero-Americano de Investigación de Operaciones e Ingenieria de Sistemas, Santiago, Chile (1994)

Member of the Program Committee for PANEL'93 - XIX Conferencia Latinoamericana de Informática, Buenos Aires, Argentina (1993)

Member of SIAM, Mathematical Programming Society, INFORMS.

BOOKS AND SPECIAL ISSUES OF JOURNALS EDITED

1. *Essays and Surveys in Metaheuristics*, co-editors: C.C. Ribeiro and P. Hansen, Kluwer, 2001.

2. *Applications of Combinatorial Optimization*, co-editors: C.C. Ribeiro and N. Maculan, volume 50 of **Annals of Operations Research**, J.C. Baltzer, 1994.

3. *Progress in Mathematical Programming*, co-editors: C.C. Ribeiro and P. Mahey, volume 52 of **Mathematical Programming**, North-Holland, 1991.

4. *Surveys in Combinatorial Optimization*, co-editors: G. Laporte, S. Martello, M. Minoux, and C.C. Ribeiro, volume 31 of **Annals of Discrete Mathematics**, North-Holland, 1987.

RESEARCH PAPERS SUBMITTED FOR PUBLICATION

1. *"Automatic Scheduling of Hypermedia Documents with Elastic Times"* (with M.T. Medina and L.F.G. Soares), submitted, 2001.

2. *"Preprocessing Steiner Problems from VLSI Layout"* (with E. Uchoa and M.V. Poggi de Aragão), submitted, 1999.

3. *"Local Search for the Bin Packing Problem"* (with A.C.F. Alvim, F. Glover and D.J. Aloise), submitted, 1999.

RESEARCH PAPERS IN JOURNALS AND BOOKS

4. *"A Hybrid GRASP with Perturbations and Adaptive Path-Relinking for the Steiner Problem in Graphs"* (with E. Uchoa and R.F. Werneck), **INFORMS Journal on Computing**, 2001, to appear.

5. *"Local Search with Perturbations for the Prize-Collecting Steiner Tree Problem"* (with S.A. Canuto and M.G.C. Resende), **Networks**, 2001, to appear.

6. *"Variable Neighborhood Search for the Degree-Constrained Minimum Spanning Tree Problem"* (with M.C. Souza), **Discrete Applied Mathematics**, 2001, to appear.

7. *"Using UML-FW to Enhance Framework Development: A Case Study in the Local Search Heuristics Domain"* (with M. Fontoura, C.J. Lucena, A. Andreatta, and S.E. Carvalho), **Journal of Systems and Software**, 2001, to appear.

8. *"Probability Distribution of Solution Time in GRASP: An Experimental Investigation"* (with R.M. Aiex and M.G.C. Resende), **Journal of Heuristics**, 2001, to appear.

9. *"Heuristics for the Inference of Phylogenetic Trees"* (with A.A. Andreatta), **Journal of Heuristics**, 2001, to appear.

10. *"Strategies for the Parallel Implementation of Metaheuristics"* (with V.-D. Cung, S. Martins, and C. Roucairol), in **Essays and Surveys in Metaheuristics**, Kluwer, 2001, to appear.

11. *"Reactive Tabu Search with Path-relinking for the Steiner Problem in Graphs"* (with M.P. Bastos), in **Essays and Surveys in Metaheuristics**, Kluwer, 2001, to appear.

12. *"Parallel Cooperative Approaches for the Labor Constrained Scheduling Problem"* (with C.B. Cavalcante, V.C. Cavalcante, and C.C. de Souza), in **Essays and Surveys in Metaheuristics**, Kluwer, 2001, to appear.

13. *"A Framework for Local Search Heuristics for Combinatorial Optimization Problems"* (with A.A. Andreatta and S.E.R. Carvalho), in **Optimization Software Class Libraries**, Kluwer, 2001, to appear.

14. *"GRASP: une métaheuristique gloutonne et probabiliste"*, in **Métaheuristiques et Outils Nouveaux en Recherche Opérationnelle** (J. Teghem and M. Pirlot, editors), Hermès, 2001, to appear.

15. *"Parallel Computing Environments"* (com S.L. Martins and N.R. Rodriguez), in **Handbook of Applied Optimization**, Oxford, 2001, to appear.

16. *"Graph Planarization"* (with M.G. Resende), in **Encyclopaedia of Optimization**, Kluwer, 2001, to appear.

17. *"A Parallel GRASP for the Steiner Tree Problem in Graphs Using a Hybrid Local Search Strategy"* (with S.L. Martins, M.G.C. Resende, and P. Pardalos), **Journal of Global Optimization** 17 (2000), 267-283.

18. *"Tabu Search for the Steiner Problem in Graphs"* (with M.C. Souza), **Networks** 36 (2000), 138-146.

19. *"A Reactive GRASP for a Matrix Decomposition Problem in Traffic Assignment"* (with M. Prais), **INFORMS Journal on Computing** 12 (2000), 164-176.

20. *"Performance Evaluation of a Parallel Tabu Search Task Scheduling Algorithm"* (with S.C. Porto and J.P. Kitajima), **Parallel Computing** 26 (2000), 73-90.

21. *"Parameter Variation in GRASP Implementations"* (with M. Prais) (in Portuguese), **Investigación Operativa** 9 (2000), 1-20.

22. *"Algorithm 797: FORTRAN Subroutines for Approximate Solution of Graph Planarization Problems using GRASP"* (with M.G. Resende), **ACM Transactions on Mathematical Software** 25 (1999), 341-352.

23. *"Greedy Randomized Adaptive Search Procedures for the Steiner Problem in Graphs"* (with S.L. Martins, P. Pardalos, and M.G. Resende), *DIMACS Series in Discrete Mathematics and Theoretical Computer Science* 43 (1999), 133-146.

24. *"A New Formulation for Scheduling Unrelated Processors under Precedence Constraints"* (with N. Maculan, S.C. Porto, and C.C. de Souza), **RAIRO Recherche Opérationnelle** 33 (1999), 87-90.

25. *"Cooperative Multi-Thread Parallel Tabu Search with an Application to Circuit Partitioning"* (with R.M. Aiex, S.L. Martins, and N.R. Rodriguez), **Lecture Notes in Computer Science** 1457 (1998), Proceedings of IRREGULAR'98 - 5th International Symposium on Solving Irregularly Structured Problems in Parallel, Springer-Verlag, 310-331.

26. *"A Parallel GRASP for the Steiner Problem in Graphs"* (with S.L. Martins, and M.C. de Souza), **Lecture Notes in Computer Science** 1457 (1998), Proceedings of IRREGULAR'98 - 5th International Symposium on Solving Irregularly Structured Problems in Parallel, Springer-Verlag, 285-297.

27. *"Exploring Load Balancing in Parallel Processing of Recursive Queries"* (with S. Lifschitz and A. Plastino), **Lecture Notes in Computer Science** 1300 (1997), Proceedings of Euro-Par'97 - Third International Euro-Par Conference (C. Lengauer, M. Griebl and S. Gorlatch, eds.), Springer-Verlag, 1125-1129.

28. *"Query Optimization in Distributed Relational Databases"* (with R.S.G. Lanzelotte and C.D. Ribeiro), **Journal of Heuristics** 3 (1997), 5-23.

29. *"A GRASP for Graph Planarization"* (with M. Resende), **Networks** 29 (1997), 173-189.

30. *"A Case Study on Parallel Synchronous Implementations of Tabu Search Based on Neighborhood Decomposition"* (with S.C. Porto), **Investigación Operativa** 5 (1996), 233-259.

31. *"Parallel Programming Tools for Distributed Memory Environments "* (with S.L. Martins and N.R. Rodriguez) (in Portuguese), **Investigación Operativa** 5 (1996), 67-98.

32. *"Parallel Tabu Search Message-Passing Synchronous Strategies for Task Scheduling under Precedence Constraints"* (with S.C. Porto), **Journal of Heuristics** 1 (1995), 207-223.

33. *"A Tabu Search Approach to Task Scheduling on Heterogeneous Processors under Precedence Constraints"* (with S.C. Porto), **International Journal of High Speed Computing** 7 (1995), 45-71.

34. *"A Graph Partitioning Heuristic for the Parallel Pseudo-Exhaustive Logical Test of VLSI Combinational Circuits"* (with A.A. Andreatta), **Annals of Operations Research** 50 (1994), 1-36.

35. *"A Multi-Criteria Tabu Search Approach to Cell Formation Problems in Group Technology with Multiple Objectives"* (with A. Hertz, B. Jaumard, and W.P. Formosinho Filho), **RAIRO Recherche Opérationnelle** 28 (1994), 303-328.

36. *"Modelling Location and Sizing of Offshore Platforms"* (with P. Hansen and E.L. Pedrosa Filho), **European Journal of Operational Research** 72 (1994), 602-606.

37. *"A Graph Theory Approach to Subcontracting, Machine Duplication and Intercell Moves in Cellular Manufacturing"* (with A. Hertz and B. Jaumard), **Discrete Applied Mathematics** 50 (1994), 255-265.

38. *"A Constraint Generation Scheme for Probabilistic Linear Problems with an Application to Power System Expansion Planning"* (with C.M. Leopoldino, L.M. Pinto, and M.V. Pereira), **Annals of Operations Research** 50 (1994), 367-385.

39. *"A Column Generation Approach to the Multiple-Depot Vehicle Scheduling Problem"* (with F. Soumis), **Operations Research** 42 (1994), 41-52.

40. *"Implication Graph and Quadratic 0-1 Optimization"* (with B. Jaumard), **Investigación Operativa** 4 (1994), 85-101.

41. *"New Efficient Heuristics for the Minimum Rectilinear Steiner Tree Problem: New Algorithms and a Computational Study"* (with C.C. de Souza), **Discrete Applied Mathematics** 45 (1993), 205-220.

42. *"Penalty Computations for the Set Partitioning Problem"* (with B. Jaumard and M. Prais), **Annals of Operations Research** 43 (1993), 285-293.

43. *"Clustering and Clique Partitioning: Simulated Annealing and Tabu Search Approaches"* (with J.-P. Barthélemy and S.G. de Amorim Jr.), **Journal of Classification** 9 (1992), 17-41.

44. *"Location and Sizing of Offshore Platforms for Oil Exploration"* (with P. Hansen and E.L. Pedrosa Filho), **European Journal of Operational Research** 58 (1992), 202-214.

45. *"A Linear Time Algorithm for the Computation of Some Distance Functions between Convex Polygons"* (with M.J. Atallah and S. Lifschitz), **RAIRO Recherche Opérationnelle** 25 (1991), 413-424.

46. *"Hyperbolic 0-1 Programming and Query Optimization in Information Retrieval"* (with P. Hansen and M.V. Poggi de Aragão), **Mathematical Programming** 52 (1991), 255-263.

47. *"Computing Some Distance Functions between Polygons"* (with M.J. Atallah and S. Lifschitz), **Pattern Recognition** 24 (1991), 775-781.

48. *"Boolean Query Optimization and the 0-1 Hyperbolic Sum Problem"* (with P. Hansen and M.V. Poggi de Aragão), **Annals of Mathematics and Artificial Intelligence** 1 (1990), 97-109.

49. *"A Tight Worst Case Bound for the Performance Ratio of Heuristics for the Minimum Rectilinear Steiner Tree Problem"* (with C.C. de Souza), **OR Spektrum** 12 (1990), 109-111.

50. *"The Steiner Problem with Rectilinear Distances"* (in Portuguese, with C.C. de Souza), **Investigación Operativa** 1 (1990), 213-249.

51. *"An Optimal Column-Generation-with-Ranking Algorithm for Very Large Scale Set Partitioning Problems in Traffic Assignment"* (with M. Minoux and M.C. Penna), **European Journal of Operational Research** 41 (1989), 232-239.

52. *"Optimal Matching of Convex Polygons"* (with P. Cox, H. Maitre, and M. Minoux), **Pattern Recognition Letters** 9 (1989), 327-334.

53. *"Análise da Complexidade de Algoritmos em Arquiteturas Paralelas - Estudo de Caso: A Técnica de Divisão e Conquista"* (with L. Toscani), **Pesquisa Operacional** 7 (1987), no. 2, 66-86.

54. *"Short-Term Generation Scheduling of Hydraulic Multi-Reservoir Multi-Area Interconnected Systems"* (with S.M. Amado), **IEEE Transactions on Power Systems** PWRS-2 (1987), 758-763.

55. *"Parallel Computer Models and Combinatorial Algorithms"*, **Annals of Discrete Mathematics** 31 (1987), 325-364.

56. *"Solving Hard Constrained Shortest Path Problems by Lagrangean Relaxation and Branch-and-Bound Algorithms"* (with M. Minoux), **Methods of Operations Research** 53 (1986), 305-316.

57. *"Le Calcul Parallèle et ses Applications en Optimisation Combinatoire"*, **L'Écho des Recherches** 119/120 (1985), 57-64.

58. *"A Heuristic Approach to Hard Constrained Shortest Path Problems"* (with M. Minoux), **Discrete Applied Mathematics** 10 (1985), 125-138.

59. *"Performance Evaluation of Vector Implementations of Combinatorial Algorithms"*, **Parallel Computing** 1 (1984), 287-294.

60. *"A Transformation of Hard (Equality Constrained) Knapsack Problems into Constrained Shortest Path Problems"* (with M. Minoux), **Operations Research Letters** 3 (1984), 211-214.

RESEARCH PAPERS IN CONFERENCE PROCEEDINGS

61. *"A Hybrid GRASP with Perturbations and Adaptive Path-Relinking for the Steiner Problem in Graphs"* (with E. Uchoa and R.F. Werneck), **Workshop on Algorithm Engineering as a New Paradigm**, 76–116, Kyoto (Japan), 2000.

62. *"A Tool for SPMD Application Development with Support for Load Balancing"* (with A. Plastino and N.R. Rodriguez), **Proceedings of the International Conference ParCo'99** (E.H.D'Hollander, G.R.Joubert, F.J.Peters, and H.J.Sips, editors), 639–646, Imperial College Press, 2000.

63. *"A Framework for SPMD Applications with Load Balancing"* (with A. Plastino and N.R. Rodriguez), **Proceedings of the 12th Symposium on Computer Architecture and High Performance Computing (SBAC-PAD'2000)**, 245–252, São Pedro (Brazil), 2000.

64. *"Model-based Scene Recognition Using Graph Fuzzy Homomorphism Solved by Genetic Algorithm"* (with A. Perchant, C. Boeres, I. Bloch, and M. Roux), Proceedings of the **2nd IAPR TC-15 Workshop on Graph-based Representations in Pattern Recognition**, 61–70, Wachau (Austria), 1999.

65. *"Local Search with Perturbations for the Prize-Collecting Steiner Tree Problem"* (with S.A. Canuto and M.G.C. Resende), **Deuxième école d'hiver des télécommunications de Sophia Antipolis**, 411–425, Antibes (France), 1999.

66. *"An Object-Oriented Framework for Local Search Heuristics"* (with A.A. Andreatta and S.E.R. Carvalho), **26th Conference on Technology of Object-Oriented Languages and Systems (TOOLS USA'98)**, 33–45, IEEE Computer Society, Santa Monica (United States), 1998.

67. *"Load Balancing in the Parallelization of the GRASP Metaheuristic"* (with A.C.F. Alvim) (in Portuguese), **X Simpósio Brasileiro de Arquitetura de Computadores**, 279–282, Búzios (Brazil), 1998.

68. *"Location and Sizing of Off-Shore Platforms for Oil Exploration"* (with P. Hansen and E.L. Pedrosa Filho), **Proceedings of the Workshop Advances in Operations Research in the Oil and Gas Industry** (M. Breton and G. Zaccour, eds.), 47-50, Éditions Technip, Montréal (Canada), 1991.

RESEARCH PAPERS IN PREPARATION

69. *"Parallel Heuristic Cut Generation Procedure for Service Cost Allocation in Transmission Systems"* (with R.M. Aiex and M.V. Poggi de Aragão).

COMMUNICATIONS AT INTERNATIONAL CONFERENCES AND INVITED TALKS

1. *"Probability Distribution of Solution Time in GRASP: An Experimental Investigation"*, **17th International Symposium on Mathematical Programming**, Atlanta (United States), August 2000.

2. *"Preprocessing Steiner Problems from VLSI Layout"*, **17th International Symposium on Mathematical Programming**, Atlanta (United States), August 2000.

3. *"Variable Neighborhood Search for the Degree-constrained Minimum Spanning Tree Problem"*, **17th International Symposium on Mathematical Programming**, Atlanta (United States), August 2000.

4. *"Local Search with Perturbations for the Prize-collecting Steiner Tree Problem"*, **17th European Conference on Operational Research**, Budapest (Hungary), July 2000.

5. *"Variable Neighborhood Search for the Degree-constrained Minimum Spanning Tree Problem"*, **XIII Annual Meeting of the EURO Working Group on Combinatorial Optimization**, Capri (Italy), May 2000.

6. *"Parallel Cut Generation for Service Cost Allocation in Transmission Systems"*, **Laboratoire PRiSM, Université de Versailles**, Versailles (France), December 1999.

7. *"Local Search with Perturbations for the Prize-Collecting Steiner Tree Problem"*, **ISIMA**, Clermont-Ferrand (France), December 1999.

8. *"Local Search with Perturbations for the Prize-Collecting Steiner Tree Problem"*, Invited conference, **Deuxième école d'hiver des télécommunications de Sophia Antipolis**, Antibes (France), December 1999.

9. *"Algorithmic Advances for the Steiner Problem in Graphs"*, Invited tutorial, **III Joint ALIO-EURO Joint Workshop on Applied Combinatorial Optimization**, Erice (Italy), November 1999.

10. *"Greedy Randomized Adaptive Search Procedures for the Steiner Problem in Graphs"* (with M.G.C. Resende, S.L. Martins, and P.M. Pardalos), **INFORMS Fall Meeting**, Philadelphia, November 1999.

11. *"Heuristics for the Phylogeny Problem"* (with A.A. Andreatta), **IFORS'99 - The 15th Triennial World Conference on Operations Research**, Beijing (China), August 1999.

12. *"Improved Tabu Search for the Steiner Problem in Graphs"* (with M.C. Souza), **IFORS'99 - The 15th Triennial World Conference on Operations Research**, Beijing (China), August 1999.

13. *"A Column Generation Approach for Cell Formation Problems in Cellular Manufacturing"* (with B. Jaumard and P. Labit), **Journées de l'Optimisation**, Montréal (Canadá), May 1999.

14. *"Heuristics for the Inference of Phylogenetic Trees"*, **School of Computer Science, University of Oklahoma**, Norman, April 1998.

15. *"A Comparative Study of Heuristics for the Computation of Phylogenetic Trees"* (with A. Andreatta), **INFORMS National Meeting**, Montréal (Canada), April 1998.

16. *"Local Search and Metaheuristics"*, Invited tutorial, **APORS'97 - 4th Conference of the Association of Asian-Pacific Operational Research Societies**, Melbourne (Australia), November 1997.

17. *"A Framework for the Development of Local Search Heuristics for Combinatorial Problems"* (with A.A. Andreatta and S.E. Carvalho), **APORS'97 - 4th Conference of the Association of Asian-Pacific Operational Research Societies**, Melbourne (Australia), November 1997.

18. *"A GRASP for a Matrix Decomposition Problem in Traffic Assignment"* (with M. Prais), **APORS'97 - 4th Conference of the Association of Asian-Pacific Operational Research Societies**, Melbourne (Australia), November 1997.

19. *"A GRASP for a Matrix Decomposition Problem in Traffic Assignment"* (with M. Prais), **INFORMS National Meeting**, Dallas, October 1997.

20. *"A Parallel GRASP for the Steiner Tree Problem in Graphs"* (with S.L. Martins and M.C. de Souza), **INFORMS National Meeting**, Dallas, October 1997.

21. *"A Framework for the Development of Local Search Based Heuristics for Combinatorial Optimization Problems"* (with A.A. Andreatta and S.E. Carvalho), **XVI International Symposium on Mathematical Programming**, Lausanne (Switzerland), August 1997.

22. *"A GRASP for a Matrix Decomposition Problem in Traffic Assignment"* (with M. Prais), **XVI International Symposium on Mathematical Programming**, Lausanne (Switzerland), August 1997.

23. *"A Framework for the Development of Local Search Based Heuristics for Combinatorial Optimization Problems"* (with A.A. Andreatta and S.E. Carvalho), **MIC'97 - II Metaheuristics International Conference**, Sophia-Antipolis (France), July 1997.

24. *"A GRASP for a Matrix Decomposition Problem in Traffic Assignment"* (with M. Prais), **MIC'97 - II Metaheuristics International Conference**, Sophia-Antipolis (France), July 1997.

25. *"Parallelism and Combinatorial Optimization"*, Invited talk, **IV Escuela Latino-Americana de Verano en Investigación Operativa**, Montevideo (Uruguay), February 1997.

26. *"An Asynchronous Parallel Tabu Search Strategy with an Application to VLSI Partitioning"*, **Université de Versailles**, Versailles (France), December 1996.

27. *"More on a GRASP for Graph Planarization"* (with M.G. Resende), **INFORMS National Meeting**, Atlanta, November 1996.

28. *"Asynchronous Parallel Tabu Search Applied to Circuit Partitioning"* (with R.M. Aiex), **INFORMS National Meeting**, November 1996.

29. *"Metaheuristics and Applications"*, Tutorial (3 hours), **Advanced School on Artificial Intelligence**, APDIO, Estoril (Portugal), October 1996.

30. *"A GRASP for Graph Planarization"*, **IFORS 96 - The 14th Triennial World Conference on Operations Research**, Vancouver (Canada), July 1996.

31. *"A GRASP for Graph Planarization"*, **8th SIAM Conference on Discrete Mathematics**, Baltimore, June 1996.

32. *"Adaptive Heuristic Search Procedures for Task Scheduling on Heterogeneous Processors under Precedence Constraints"*, Opening Conference, **Workshop on Scheduling for Parallel and Distributed Systems**, Marseille (France), June 1996.

33. *"A GRASP for Graph Planarization"*, Seminar, **ISIMA**, Clermont-Ferrand (France), June 1996.

34. *"Heuristics for Combinatorial Problems and Applications"*, Graduate course (10 hours), **Universidad Nacional de la República Oriental del Uruguay**, Montevidéo (Uruguai), May 1996.

35. *"Adaptive Heuristic Search Procedures for Task Scheduling on Heterogeneous Processors under Precedence Constraints"*, **ICSI - International Computer Science Institute**, Berkeley, March 1996.

36. *"Heuristic Search Methods for Combinatorial Problems and Applications in Computer Systems"*, Tutorial (6 hours), **III Escuela Latino-Americana de Verano en Investigación Operativa**, Bariloche (Argentina), January 1996.

37. *"A GRASP for Graph Planarization"*, **Université de Versailles**, Versailles (France), December 1995.

38. *"Parallel Implementations of Tabu Search - A Case Study: Task Scheduling on Heterogeneous Processors under Precedence Constraints"*, **INFORMS National Meeting**, New Orleans, November 1995.

39. *"A GRASP for Graph Planarization"*, **INFORMS National Meeting**, New Orleans, November 1995.

40. *"Applications of Tabu Search to Optimization Problems in Computer Systems"*, Plenary Conference, **2nd International Conference on Operations Research**, Havana (Cuba), October 1995.

41. *"Heuristic Search Methods for Combinatorial Problems and Applications in Computer Systems"*, Short Course (15 hours), **IX Escuela de Ciencias Informáticas**, Buenos Aires (Argentina), August 1995.

42. *"Parallel Tabu Search Message-Passing Synchronous Strategies for Task Scheduling under Precedence Constraints"*, **First Metaheuristics International Conference**, Breckenridge, July 1995.

43. *"Query Optimization in Distributed Relational Databases"*, **First Metaheuristics International Conference**, Breckenridge, July 1995.

44. *"Query Optimization in Distributed Relational Databases"*, Mathematics Research Colloquium, **AT&T Bell Laboratories**, Murray Hill, July 1995.

45. *"A GRASP for the Graph Planarization Problem"*, **INFORMS International Meeting**, Singapore (Singapore), June 1995.

46. *"Parallel Implementations of Tabu Search - A Case Study: Task Scheduling on Heterogeneous Processors under Precedence Constraints"*, **INFORMS International Meeting**, Singapore (Singapore), June 1995.

47. *"Une heuristique de partitionement de graphes pour les tests logiques pseudo-ehxaustifs en parallèle des circuits combinationnels VLSI"*, **Université de Versailles**, Versailles (France), December 1994.

48. *"A Graph Partitioning Heuristic for the Parallel Pseudo-Exhaustive Logical Test of VLSI Combinational Circuits"*, **Rutgers University**, New Brunswick, August 1994.

49. *"A Graph Partitioning Heuristic for the Parallel Pseudo-Exhaustive Logical Test of VLSI Combinational Circuits"*, **XV International Symposium on Mathematical Programming**, Ann Arbor, August 1994.

50. *"A Tabu Search Approach to Task Scheduling on Heterogeneous Processors under Precedence Constraints"*, **XV International Symposium on Mathematical Programming**, Ann Arbor, August 1994.

51. *"Tabu Search"*, Tutorial (3 hours), **VII Congreso Latino-Ibero-Americano de Investigación de Operaciones e Ingenieria de Sistemas**, Santiago (Chile), July 1994.

52. *"A Partitioning Heuristic for Parallel Pseudo-Exhaustive Logical Testing of VLSI Combinational Circuits"*, **VII SIAM Conference on Discrete Mathematics**, Albuquerque, June 1994.

53. *"A Partitioning Heuristic for Pseudo-Exhaustive Logical Testing of VLSI Combinational Circuits"*, **XXXII TIMS International Meeting**, Anchorage, June 1994.

54. *"A Tabu Search Approach to Task Scheduling on Heterogeneous Processors under Precedence Constraints"*, **XXXII TIMS International Meeting**, Anchorage, June 1994.

55. *"Partitionement de graphes et tests des circuits VLSI"*, **Université de Clermont-Ferrand**, Clermont-Ferrand (France), April 1994.

56. *"A Partitioning Heuristic for Parallel Pseudo-Exhaustive Logical Testing of VLSI Combinational Circuits"*, **ORSA/TIMS Joint National Meeting**, Boston, April 1994.

57. *"A Graph Partitioning Heuristic for the Parallel Pseudo-Exhaustive Logical Test of Combinational Circuits"*, **Université de Grenoble**, Grenoble (France), April 1994.

58. *"Heuristic Methods for Local Search: Theory and Applications"*, Opening Plenary Conference, **I Escuela Latino-Americana de Verano en Investigación Operativa**, Punta de Tralca (Chile), January 1994.

59. *"A Tabu Search Approach to Task Scheduling on Heterogeneous Processors under Precedence Constraints"*, **ORSA/TIMS Joint National Meeting**, Phoenix, November 1993.

60. *"A Tabu Search Approach to Cell Formation Problems in Group Technology with Multiple Objectives"*, **IFORS' 93 - XIII World Conference on Operations Research**, Lisbon (Portugal), July 1993.

61. *"A Column Generation Approach to the Multiple-Depot Vehicle Scheduling Problem"*, **VI Congreso Latino-Americano de Investigaci'on Operativa**, Mexico City (Mexico), October 1992.

62. *"Applications de la Recherche Opérationnelle en Administration de la Santé"*, Invited Talk, **Université de Montréal**, Montréal (Canada), September 1992.

63. *"A Constraint Generation Scheme for Probabilistic Linear Problems with an Application to Power System Expansion Planning"*, **GERAD**, Montréal (Canada), September 1992.

64. *"A Constraint Generation Scheme for Probabilistic Linear Problems with an Application to Power System Expansion Planning"*, **Tercer Congreso Franco-Latinoamericano de Matemáticas Aplicadas y Primera Escuela Chile-CEE de Optimización**, Santiago (Chile), August 1992.

65. *"Applications of Tabu Search"*, **INRIA**, Versailles (France), June 1992.

66. *"Approche par les graphes de certains problèmes de production cellulaire"*, **Université de Grenoble**, Grenoble (France), June 1992.

67. *"Une approche par la méthode de recherche taboo pour le problème de planarization de graphes"*, **Université Paris VI**, Paris (France), June 1992.

68. *"A Tabu Search Approach to Graph Planarization"*, **EURO XII/TIMS XXXI Joint International Conference**, Helsinki (Finland), June 1992.

69. *"A Column Generation Approach to the Multiple-Depot Vehicle Scheduling Problem"*, **EURO XII/TIMS XXXI Joint International Conference**, Helsinki (Finland), June 1992.

70. *"Peak Capacity Expansion Planning of Interconnected Hydrothermal Systems"*, **Journées de l'Optimisation 1992**, Montréal (Canada), May 1992.

71. *"A Tabu Search Approach to Cell Formation Problems in Group Technology"*, **TIMS/ORSA Joint National Meeting**, Orlando, April 1992.

72. *"A Tabu Search Approach to Graph Planarization"*, **TIMS/ORSA Joint National Meeting**, Orlando, April 1992.

73. *"A Decomposition Approach to Piecewise Linearly Constrained Problems with an Application to Peak Capacity Expansion Planning of Interconnected Hydrothermal Systems"*, **Universidad de Chile**, Santiago (Chile), January 1992.

74. *"A Column Generation Approach to the Multiple-Depot Vehicle Scheduling Problem"*, **Universidad de Chile**, Santiago (Chile), January 1992.

75. *"Tabu Search, Part II: Applications"*, **Universidad de Chile**, Santiago (Chile), January 1992.

76. *"Tabu Search, Part I: Basic Concepts"*, **Universidad de Chile**, Santiago (Chile), January 1992.

77. *"A Tabu Search Approach for Grouping Technology Problems"*, **ORSA/TIMS Joint National Meeting**, Anaheim, November 1991.

78. *"Query Optimization in Information Retrieval and Nonlinear 0-1 Programming"*, **ORSA/TIMS Joint National Meeting**, Anaheim, November 1991.

79. *"Une approche de type recherche tabou pour le problème de groupement"*, **Rencontres Franco-Suisses de Recherche Opérationnelle**, Paris (France), September 1991.

80. *"A Column Generation Approach to the Multiple-Depot Vehicle Scheduling Problem"*, **XIV International Symposium on Mathematical Programming**, Amsterdam (The Netherlands), August 1991.

81. *"A Tabu Search Approach to Cell Formation in Cellular Manufacturing"*, **TIMS XXX - SOBRAPO XXIII Joint International Meeting**, Rio de Janeiro (Brazil), July 1991.

82. *"A Column Generation Approach to the Multiple-Depot Vehicle Scheduling Problem"*, **ARIDAM VI - Sixth Advanced Research Institute on Discrete Applied Mathematics**, New Brunswick, June 1991.

83. *"Location and Sizing of Off-Shore Platforms for Oil Exploration"*, **Workshop Advances in Operations Research in the Oil and Gas Industry**, Montréal (Canada), June 1991.

84. *"A Graph Theory Approach to Subcontracting, Machine Duplication and Intercell Moves in Cellular Manufacturing"*, **Journées de l'Optimisation 1991**, Montréal (Canada), May 1991.

85. *"Subcontracting, Machine Duplication and Intercell Moves in Cellular Manufacturing"*, **COST - The First Workshop on Combinatorial Optimization in Science and Technology**, New Brunswick, April 1991.

86. *"Sous-traitance, Duplication de Machines et Mouvements Intercellulaires en Production Cellulaire"*, **Université de Montréal**, Montréal (Canada), March 1991.

87. *"Implication Graph and Quadratic 0-1 Optimization"*, **ORSA/TIMS Joint National Meeting**, Philadelphia, October 1990.

88. *"A Linear Time Algorithm for the Computation of Some Distance Functions between Convex Polygons"*, **Viewpoints in Optimization**, Grimentz (Switzerland), September 1990.

89. *"Optimal Capacity Expansion of a Multi-Area Power System with Stochastic Constraints"*, **IFORS'90 - XII Triennial Conference on Operations Research**, Athens (Greece), June 1990.

90. *"Descent/Ascent Heuristics for the Multicapacitated Plant Location Problem"*, **IFORS'90 - XII Triennial Conference on Operations Research**, Athens (Greece), June 1990.

91. *"A Linear Time Algorithm for the Computation of Some Distance Functions between Convex Polygons"*, **ARIDAM V - Fifth Advanced Research Institute on Discrete Applied Mathematics**, New Brunswick, June 1990.

92. *"A Heuristic Approach to Off-Shore Platform Location for Oil Exploration"*, **Journées de l'Optimisation 1990**, Montréal (Canada), May 1990.

93. *"Implication Graph and Quadratic 0-1 Optimization"*, **Journées de l'Optimisation 1990**, Montréal (Canada), May 1990.

94. *"A Descent-Ascent Approach to the Multicapacitated Plant Location Problem with an Application to the Location of Off-Shore Platforms"*, **GERAD**, Montréal (Canada), March 1990.

95. *"Parallel Computer Models and Combinatorial Algorithms"*, Shourt Course (15 hours), **III Escuela de Ciencias Informáticas**, Buenos Aires (Argentina), August 1989.

96. *"Descent/Ascent Heuristics for the Multicapacitated Plant Location Problem"*, **ALIO/EURO Workshop on Practical Applications of Combinatorial Optimization**, Rio de Janeiro (Brazil), August 1989.

97. *"Tabu Search et Approche par Recuit Simulé du Problème de Partitionnement des Graphes en Cliques"*, **Université de Grenoble**, Grenoble (France), July 1989.

98. *"Simulated Annealing and Tabu Search Approaches to Graph Partitioning"*, **EURO X - European Conference on Operational Research**, Belgrade (Yugoslavia), June 1989.

99. *"The Steiner Problem in Rectilinear Distances: New Heuristics and a Computational Study"*, **ARIDAM IV - Fourth Advanced Research Institute on Discrete Applied Mathematics**, New Brunswick, June 1989.

100. *"Simulated Annealing and Tabu Search Approaches to Hyperbolic Programming and Graph Partitioning"*, **Workshop on Computational Aspects of Combinatorial Optimization**, Oberwolfach (Germany), January 1989.

101. *"Complexity Theory and Analysis of Algorithms"*, Short Course (12 hours), Universidade de Lisboa, Lisbon (Portugal), January 1989.

102. *"Application of Simulated Annealing and Tabu Search to the Hyperbolic Sum and Graph Partitioning Problems"*, **INESC - Instituto de Engenharia de Sistemas e Computadores**, Coimbra (Portugal), January 1989.

103. *"Query Optimization in Classical Databases"*, **Workshop on Mathematical Programming**, Rio de Janeiro (Brazil), October 1988.

104. *"Improved Penalties for the Set Partitioning Problem"*, **IV Congreso Latino-Americano de Investigación Operativa**, Rio de Janeiro (Brazil), October 1988.

105. *"Optimal Matching of 2-D Contours"*, **XIII International Symposium on Mathematical Programming**, Tokyo (Japan), September 1988.

106. *"A Combined Branch-and-Bound/Column-Generation Approach for Some Very Large Scale Set Partitioning Problems with Special Structure"*, **XIII International Symposium on Mathematical Programming**, Tokyo (Japan), September 1988.

107. *"Optimal Weekly Generation Scheduling of Multi-Valley Hydraulic Interconnected Systems"*, **EURO IX - TIMS XXVIII Joint International Conference**, Paris (France), July 1988.

108. *"Optimal Matching of 2-D Contours"*, **EURO IX - TIMS XXVIII Joint International Conference**, Paris (France), July 1988.

109. *"Optimal Matching of 2-D Contours"*, **ARIDAM III - Third Advanced Research Institute on Discrete Applied Mathematics**, New Brunswick, May 1988.

110. *"Optimization of a 3-D Data Acquisition System for CAD"*, **First International Conference on Computer Aided Design in Engineering Schools**, Tbilisi (Soviet Union), November 1987.

111. *"Short-Term Generation Scheduling of Hydraulic Multi-Reservoir Multi-Area Interconnected Systems"*, **Université de Montréal**, Montréal (Canada), February 1987.

112. *"A Hybrid Branch-and-Bound/Column-Generation Algorithm for Large Scale Set Partitioning Problems"*, **ORSA/TIMS Joint National Meeting**, Miami, October 1986.

113. *"A Hybrid Branch-and-Bound/Column-Generation Approach for Very Large Scale Set Covering Problems with Special Structure"*, **3º Congreso Latino-Americano de Investigación Operativa**, Santiago (Chile), August 1986.

114. *"A Hybrid Branch-and-Bound/Column-Generation Approach to a Matrix Decomposition Problem"*, **ARIDAM I - First Advanced Research Institute on Discrete Applied Mathematics**, New Brunswick, May 1986.

115. *"A Hybrid Branch-and-Bound/Column-Generation Algorithm for Large-Scale Set Partitioning Problems"*, **Third SIAM Conference on Discrete Mathematics**, Clemson, May 1986.

116. *"Parallel Computers and Combinatorial Optimization Problems"*, Invited Talk, **Politechnika Poznanska**, Poznan (Poland), February 1986.

117. *"Ordinateurs Parallèles: Architectures, Algorithmes et Perspectives"*, **École Nationale Supérieure des Télécommunications**, Paris (France), February 1986.

118. *"Solving Hard Constrained Shortest Path Problems by Lagrangean Relaxation and Branch-and-Bound Algorithms"*, **XII International Symposium on Mathematical Programming**, Boston, August 1985.

119. *"A New Approach to Min-Max Quadratic Assignment Problems"*, **XII International Symposium on Mathematical Programming**, Boston, August 1985.

120. *"Parallel Computer Models and Combinatorial Algorithms"*, **School on Combinatorial Optimization**, Rio de Janeiro (Brazil), July 1985.

121. *"Le Nouvel Algorithme de Karmarkar pour la Programmation Linéaire"*, **École Nationale Supérieure des Télécommunications**, Paris (France), February 1985.

122. *"'Vectorisation d'Algorithmes Fondamentaux en Optimisation Combinatoire"*, **Séminaire sur le Calcul Parallèle et ses Applications aux Télécommunications**, Centre National d'Études des Télécommunications, Issy-les-Moulineaux (France), February 1985.

123. *"Solving Hard Constrained Shortest Path Problems"*, **ORSA/TIMS Joint National Meeting**, Dallas, November 1984.

124. *"Parallel Computing in Combinatorial Optimization"*, **2º Congreso Latino-Americano de Investigación Operativa e Ingenieria de Sistemas**, Buenos Aires (Argentina), August 1984.

125. *"L'Ordinateur Vectoriel Cray-1: Architecture, Vectorisation et Évaluation de Performance"*, **Université des Sciences et Techniques de Lille I**, Lille (France), June 1984.

126. *"Vectorisation d'Algorithmes de Cheminement"*, **Reunion du Groupe Combinatoire de l'AFCET**, Paris (France), December 1983.

127. *"Problèmes de Plus Courts Chemins avec Contraintes dans les Graphes"*, Invited Talk, **Centre de Recherche sur les Transports**, Montréal (Canada), November 1983.

128. *"A Heuristic Approach to Constrained Shortest Path Problems"*, **Summer School on Combinatorial Optimization**, Dublin (Ireland), July 1983.

129. *"Dualité en Programmation en Nombres Entiers et Applications Récentes en Optimisation Combinatoire"*, **Université Catholique de l'Ouest à Angers**, Angers (France), May 1983.

130. *"Introduction aux Modèles et aux Méthodes de la Recherche Opérationnelle"*, Short Course (12 hours), **Centre National d'Études des Télécommunications**, Issy-les-Moulineaux (France), November 1982.

131. *"Optimisation des Investissements dans les Réseaux d'Énergie Électrique"*, **Université Paris IX - Dauphine**, Paris France), May 1982.

BOOK REVIEW

1. *Algorithmes Parallèles: Analyse et Conception*, co-authors: G. Authié, A. Ferreira, J.-L. Roch, G. Villard, J. Roman, C. Roucairol, and B. Virot, **Éditions Hermès**, Paris, 1994 [Review published in *AFCET Interflash* 20 (1994), 10-11].

THESES SUPERVISED

1. *Parameter Variation Strategies in GRASP Implementations and Applications* (in Portuguese), author: M. Prais, **Catholic University of Rio de Janeiro**, Rio de Janeiro (Brazil), July 2000.

2. *Load Balancing in SPMD Parallel Applications* (in Portuguese), author: A. Plastino, **Catholic University of Rio de Janeiro**, Rio de Janeiro (Brazil), March 2000.

3. *"Metaheuristics Parallelization Strategies in Distributed Memory Environments"* (in Portuguese), author: S.L. Martins, **Catholic University of Rio de Janeiro**, Rio de Janeiro (Brazil), July 1999.

4. *"A Framework for the Development of Local Search Heuristics with an Application to the Construction of Phylogenetic Trees"* (in Portuguese), author: A.A. Andreatta, **Catholic University of Rio de Janeiro**, Rio de Janeiro (Brazil), June 1998.

5. *"Sequential and Parallel Algorithms for Task Scheduling on Heterogeneous Processors under Precedence Constraints"* (in Portuguese), author: S.C.S. Porto, **Catholic University of Rio de Janeiro**, Rio de Janeiro (Brazil), November 1995.

- 7 (seven) other Ph.D. students currently under supervision

- 20 successfull M.Sc. dissertations already supervised

TEACHING EXPERIENCE

- *Graduate courses:* Metaheuristics, Design and Analysis of Algorithms, Parallel Algorithms, Parallel Computing, Performance Analysis of Computing Systems, Applications of Combinatorial Optimization to Computing Systems, Complexity Theory, Polyhedral Combinatorics, Graphs and Algorithms, Combinatorial Optimization, Large Systems Optimization.

- *Undergraduate courses:* Discrete Structures, Data Structures, Design and Analysis of Algorithms, Graphs and Algorithms, Integer Programming, Network Optimization, Dynamic Programming, Nonlinear Optimization, Linear Algebra, Energy Planning, Programming Languages.

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