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### Education

- 1991-1996 **Doctor of Philosophy**, Computer Science, University of Waterloo, Canada. Title: On-line Target Searching in Bounded and Unbounded Domains. Supervisor: Dr. Prabhakar Ragde. (GPA A+)
- 1989-1990 **Master of Mathematics**, Computer Science, University of Waterloo, Canada. Title: Probabilistic Complexity Classes. Supervisor: Dr. Prabhakar Ragde. (GPA A+)
- 1985-1989 **Bachelors of Mathematics**, Mathematics, Universidad Nacional Autonoma de Mexico, Title: A Variant on a Numerical Method for Solving Systems of Differential Equations. Supervisor: Dr. Salvador Pérez-Esteva. (GPA 10/10)

### Academic and Professional Interests

**Applications of theoretical computer science.** My research has concentrated in finding areas in which the methods and rigorous techniques of theoretical computer science can push the state of the art in practical problems. More specifically, during the course of my research over the years I have explored at large the following areas: on-line paging, cache conscious algorithms (particularly I/O aware data structures), algorithms for scheduling and constraint programming, algorithms for information retrieval, algorithms for networks and the internet, multi-core algorithms and path planning and robotics. In each of these cases practical problems often suggest theoretical developments and, conversely, advanced theoretical data structures and algorithms suitably adapted often lead to practical breakthroughs in performance.

### Professional Academic Experience

#### Research

- 11/2007-present **Chief Scientist**. Discovery Engine. San Francisco, California.
- 07/2004-present **Associate Professor (Tenured)**. School of Computer Science, University of Waterloo.
- 08/2001-06/2004 **Assistant Professor**. School of Computer Science, University of Waterloo.
- 08/2001-present **Adjunct Professor**. Faculty of Computer Science, University of New Brunswick.
- 09/2000-08/2001 **Director of Internet Research**. Internap Network Services Corporation.
- 07/2001-08/2001 **Associate Professor**. Promoted *in-absentia*. Faculty of Computer Science. University of New Brunswick.
- 01/1998-07/2001 **Assistant Professor**. Algorithmic Foundations of Robotics and Director of Internet Computing Laboratory (4 faculty members; 7 graduate students). Faculty of Computer Science. University of New Brunswick.
- 02/1996-12/1997 **Research Scientist**. Senior Data Structures and Algorithms Specialist. Open Text Corporation.

## **Teaching**

<b>Course</b>	<b>Institution</b>	<b>Term</b>
Adaptive, Online, Parameterized Algorithms	University of Waterloo	S07
Data Types and Data Structures (2 <sup>nd</sup> year)	University of Waterloo	F06, S07
Data Structures and Data Management (2 <sup>nd</sup> year)	University of Waterloo	F06, W04, F03
Five Open Problems in Algorithms and Data Structures (graduate)	University of Waterloo	S06
Advanced Algorithms (4 <sup>th</sup> year/graduate)	University of Waterloo	F05
Algorithms (3 <sup>rd</sup> year)	University of Waterloo	S06, F05, W05, F04
Algorithmic Foundations of the Internet (graduate)	University of Waterloo	W05, W04
Computer Networks (4 <sup>th</sup> year/graduate)	University of Waterloo	F03, W03
Algorithmic Problems on the Internet (graduate)	University of Waterloo	S02
Operating Systems (3 <sup>rd</sup> year course)	University of Waterloo	F01
Topics on Internet Research (graduate)	University of New Brunswick	F99
Computer Systems Organization (3 <sup>rd</sup> year)	University of New Brunswick	W00, F99
Advanced Algorithmic Techniques (4 <sup>th</sup> year)	University of New Brunswick	F99
Data Structures (3 <sup>rd</sup> year)	University of New Brunswick	W99
Discrete Structures I (1 <sup>st</sup> year)	University of New Brunswick	W99
Algorithmic Foundations of Robotics (4 <sup>th</sup> year/graduate)	University of New Brunswick	W00, F98
Numerical Analysis (3 <sup>rd</sup> year)	University of New Brunswick	W98, F98
Computational Complexity (4 <sup>th</sup> year/graduate)	University of Waterloo	W94
Advanced Data Structures in C (2 <sup>nd</sup> year)	Wilfrid Laurier University	W93
Data Structures and Algorithms (3 <sup>rd</sup> year)	University of Waterloo	F91
Introduction to Programming (1 <sup>st</sup> year)	Univ. Nac. Autónoma de México	1987-1988

## **Consulting**

1. Terapath. Algorithmic advice for high performance systems. April 2007.
2. Office of Critical Infrastructure Protection and Emergency Preparedness, Department of National Defense, Government of Canada. An Architecture for Performance and Stability Measurements on the Internet. July-2003, February-2004.
3. Vigilant Systems. Advice on System Architecture and Code evaluation for a POS object-oriented system. July-October 2000.
4. Electronic Text Centre. Consulting for the SchoolNet Metadata project for Industry Canada, 1999.
5. Reid Advertising. Advice on HTML design and implementation issues for Reid Advertising, Waterloo, Canada. 1995.
6. ESI Systems. Advice in the selection process for a regional software distributor in Mexico for ESI Systems, Florida, USA. 1994.

## **Editorial**

### **Journal**

1. Guest co-editor joint with J. Ian Munro. Special issue of selected papers from SODA 2004. ACM Transactions on Algorithms, Volume 2, Number 4, October 2006.
2. Guest co-editor. Special issue of selected papers from CAAN 2005. Journal of Internet Mathematics.

### **Program Chair**

1. Dagstuhl Seminar on Adaptive, Output Sensitive, Online and Parameterized Algorithms. Joint with R. Klein, R. Niedermeier and J. Barbay. 2007.
2. DIMACS 2007-2010 Special Focus on Algorithmic Foundations of the Internet. Joint Organizing Committee with Jennifer Rexford, Princeton University and Rebecca Wright, Rutgers University.

3. Dagstuhl Seminar on Robot Navigation. Joint with S. Fekete, R. Fleischer and R. Klein. 2006.
4. Workshop on Algorithms and Data Structures (WADS). Joint PC with Frank Dehne and Jorg R. Sack, 2005.
5. Workshop on Combinatorial and Algorithmic Aspects of Networking, 2004.
6. Dagstuhl Seminar on On-line Navigation. Joint with R. Fleischer and R. Klein. 2003.

**Program committee member:**

1. 21<sup>th</sup> Canadian Conference on Artificial Intelligence, 2008.
2. 23<sup>rd</sup> AAAI Conference on Artificial Intelligence (AAAI), 2008.
3. 10<sup>th</sup> Workshop on Algorithm Engineering and Experiments (ALENEX), 2008.
4. Workshop on Algorithms and Computation (WALCOM), 2008.
5. 8<sup>th</sup> Latin-American Conference on Informatics (LATIN), 2008.
6. 4<sup>th</sup> Workshop on Combinatorial and Algorithmic Aspects of Networking (CAAN), 2007.
7. Workshop on Algorithms and Computation (WALCOM), 2007.
8. 20<sup>th</sup> Canadian Conference on Artificial Intelligence, 2007.
9. 3<sup>rd</sup> Workshop on Combinatorial and Algorithmic Aspects of Networking (CAAN), 2006.
10. 7<sup>th</sup> International Conference on Computer Science (ENC), 2006.
11. 8<sup>th</sup> Workshop on Algorithm Engineering and Experiments (ALENEX), 2006.
12. 19<sup>th</sup> Canadian Conference on Artificial Intelligence, 2006.
13. 2<sup>nd</sup> Workshop on Combinatorial and Algorithmic Aspects of Networking (CAAN), 2005.
14. 15<sup>th</sup> Annual ACM-SIAM Symposium on Discrete Algorithms (SODA), 2004.
15. 10<sup>th</sup> Annual International Computing and Combinatorics Conference (COCOON), 2004.
16. 6<sup>th</sup> Latin-American Conference on Informatics (LATIN), 2004.
17. 15<sup>th</sup> Canadian Conference on Computational Geometry (CCCG), 2003.
18. 14<sup>th</sup> Canadian Conference on Computational Geometry (CCCG), 2002.
19. 5<sup>th</sup> Latin-American Conference on Informatics (LATIN), 2002.
20. 12<sup>th</sup> Canadian Conference on Computational Geometry (CCCG), 2000.

**Journal/Conference referee (arranged by year) for:**

ACM Symposium on the Theory of Computing (STOC), 2008. Mathematics of Operations Research Journal (MOR), 2008. Data Compression Conference (DCC), 2008. ACM-SIAM Symposium on Data Structures (SODA), 2008. IEEE Symposium on Foundations of Computer Science (FOCS), 2007a, 2007b, 2007c, 2007d, 2007e. Mathematical Foundations of Computer Science, (MFCS), 2007. European Symposium of Algorithms, (ESA), 2007a, 2007b. International Colloquium on Automata, Languages, and Programming (ICALP), 2007. SIAM Journal on Computing, 2007a, 2007b. International Symposium on Distributed Computing (DISC), 2007. ACM-SIAM Symposium on Data Structures (SODA), 2007a, 2007b, 2007c, 2007d, 2007e, 2007f. Algorithmica, 2006. IEEE/ACM Transactions on Networking, 2006. International Colloquium on Automata, Languages and Programming (ICALP), 2006a, 2006b, 2006c. ACM Transactions on Algorithms (TALG), 2006. Combinatorial Pattern Matching (CPM), 2006a, 2006b. Latin-American Conference on Informatics (LATIN), 2006. ACM Transactions on Algorithms (TALG), 2005a, 2005b. Computational Geometry: Theory and Applications (CGTA), 2005. Artificial Intelligence Journal (AIJ), 2005. Theoretical Computer Science (TCS), 2005. ACM Symposium on the Theory of Computing (STOC) 2005. ACM Symposium on Computational Geometry (SoCG), 2005a, 2005b, 2005c. Symposium on Theoretical Aspects of Computer Science (STACS), 2005. ACM-SIAM Symposium on Data Structures (SODA), 2005. European Symposium of Algorithms, (ESA), 2004. SIAM Journal on Computing, 2004. Informatica, 2004. ACM Symposium on Computational Geometry (SoCG), 2004. Scandinavian Workshop on Algorithms and Theory (SWAT), 2004. Theoretical Computer Science (TCS), 2004a, 2004b. IEEE Transactions on Robotics, 2003a, 2003b. Journal of Experimental Algorithms, 2003. ACM Symposium on Parallel Algorithms and Architectures (SPAA), 2003. International Symposium on String Processing and Information Retrieval (SPIRE

2003). Workshop on Algorithmic Engineering and Experiments (ALENEX), 2003a, 2003b, 2003c, 2003d. SIAM Journal on Computing, 2002. International Colloquium on Automata, Languages, and Programming (ICALP), 2002. Theoretical Computer Science (TCS), 2002a, 2002b. Nordic Journal of Computer Science, 2002. Acta Informatica, 2001. Information Processing Letters (IPL), 2000. Scandinavian Workshop on Algorithms and Theory (SWAT), 2000. Computational Geometry: Theory and Applications (CGTA), 1999. Symposium on Theoretical Aspects of Computer Science (STACS), 1999. ACM Symposium on Computational Geometry (SoCG), 1999. Information Processing Letters (IPL), 1997. Information Processing Letters (IPL), 1996.

#### **Editorial Book review:**

- Princeton University Press, 2006.
- John Wiley & Sons. Wiley-Interscience Publication, 2000.

**Grant review:** NSERC 2007a, 2007b, 2006, 2004, 2003. FONDECYT, Chile, 2007. Israel Science Foundation (ISF), 2007. MITACS, 2005.

## **Publications**

### **Books and Volumes Edited**

1. *Proceedings of the Workshop on Combinatorial and Algorithmic Aspects of Networking*, Angèle Hamel and A. López-Ortiz, eds. Lecture Notes in Computer Science, 3405, Springer, 2005.
2. *Proceedings of the 9th Workshop on Algorithms and Data Structures*, eds. Frank Dehne, A. López-Ortiz and Jörg-Rüdiger Sack, Lecture Notes in Computer Science, 3608, Springer, 2005.

### **Book Chapters**

3. "Overprovisioning or Rightprovisioning?". A López-Ortiz. To appear in proceedings of the *Fourth Workshop on Combinatorial and Algorithmic Aspects of Networking*. Lecture Notes in Computer Science, Springer Verlag, 2007.
4. "Closing the gap between theory and practice: New measures for on-line algorithm analysis", Reza Dorrigiv and A. López-Ortiz. To appear in proceedings of the *2008 Workshop on Algorithms and Computation (WALCOM)*, Lecture Notes in Computer Science, Springer Verlag, 2008.
5. "Algorithmic Foundations of the Internet". A. López-Ortiz. Proceedings of the *First Workshop on Combinatorial and Algorithmic Aspects of Networking*, Angèle Hamel and A. López-Ortiz, eds. Lecture Notes in Computer Science, 3405, Springer Verlag, 2005.
6. "Search Engines and Web Information Retrieval". Proceedings of the *First Workshop on Combinatorial and Algorithmic Aspects of Networking*, Angèle Hamel and A. López-Ortiz, eds. Lecture Notes in Computer Science, 3405, Springer Verlag, 2005.

### **Journal Articles**

7. "A Quadratic Propagator for the Inter-Distance Constraint", Claude-Guy Quimper, A. López-Ortiz, Gilles Pesant. Invited submission to Special Issue of *Constraint Programming Letters* journal on selected constraint programming papers from AAAI'06, to appear.
8. "An Efficient Bound Consistency Algorithm for the Global Cardinality Constraint Problem". Claude-Guy. Quimper, Alexander Golynski, A. López-Ortiz, and Peter van Beek. In *Journal of Constraints*, pp. 115-135, 2005. Invited paper to special issue of selected papers from 9<sup>th</sup> International Conference on Principles and Practice of Constraint Programming (CP'03).
9. "Fast String Sorting using Order Preserving Compression". A. López-Ortiz, Mahdi Mirzazadeh, Mohammed Ali Safari and Hossein SheikhAttar. *Journal of Experimental Algorithmics*, v. 10, 2005.

10. "Longest Increasing Subsequences in Sliding Windows", Michael H. Albert, Alexander Golynski, Angele M. Hamel, A. López-Ortiz Srinivas S. Rao and Mohammed Ali Safari. *Theoretical Computer Science*, v. 321, pp.405-414, 2004.
11. "On-line Parallel Heuristics and Robot Searching under the Competitive Framework". A. López-Ortiz and Sven Schuierer. *Theoretical Computer Science*, v. 310, no 1-3, pp. 527-537, 2004.
12. "Finding Hidden Independent Sets in Interval Graphs". Therese Biedl, Brona Brejová, Erik D. Demaine, Angele M. Hamel, A. López-Ortiz and Tomas Vinař. *Theoretical Computer Science*, v. 310, no 1-3, pp. 287-307, 2004.
13. "A Linear Lower Bound on Index Size for Text Retrieval". Erik D. Demaine and A. López-Ortiz. *Journal of Algorithms. Journal of Algorithms*, Vol. 48, no. 1, pp. 2-15, 2003. Invited paper to special issue of selected papers from the 12<sup>th</sup> ACM-SIAM Symposium on Discrete Algorithms, 2001.
14. "Drawing  $K_{2,n}$ : A Lower Bound". Therese Biedl, Timothy Chan, A. López-Ortiz. *Information Processing Letters*, v. 85, n. 6, 2003, pp. 303-305. (Also in CCCG'02 conference).
15. "On Universally Easy Classes for NP-complete Problems". Erik D. Demaine\*, A. López-Ortiz and J. Ian Munro. *Theoretical Computer Science*, vol. 304, no 1-3, pp. 471-476, 2003, (Also in SODA'01).
16. "Searching and On-line Recognition of Star Shaped Polygons". A. López-Ortiz and Sven Schuierer. *Information and Computation*, vol. 185, no. 1, pp. 66-88, 2003.
17. "Online Routing in Convex Subdivisions". Prosenjit Bose, Andrej Brodnik, Svante Carlsson, Erik D. Demaine, Rudolf Fleischer, A. López-Ortiz, Pat Morin, and J. Ian Munro. *International Journal of Computational Geometry and Applications*, v. 12, n. 4, August 2002, pp. 283-295. Special issue of selected papers from the 11th Annual International Symposium on Algorithms and Computation, (ISAAC 2000).
18. "Lower Bounds for Streets and Generalized Streets". A. López-Ortiz and Sven Schuierer. *International Journal of Computational Geometry and Applications*, v. 11, n.4, 2001, pp 401-421.
19. "The Ultimate Strategy to Search on m-Rays?" A. López-Ortiz and Sven Schuierer. *Theoretical Computer Science*, v. 261, n.1, pp. 267-295, 2001. Special issue of selected papers from 4<sup>th</sup> Annual International Computing and Combinatorics Conference, (COCOON'98).
20. "Rounding Cubic Roots and the American Mathematical Monthly". A. López-Ortiz and Luke O'Connor. Research note. *Miscelánea Matemática*, Mexican Mathematical Society, July 1999.
21. "New Lower Bounds for Element Distinctness on a One-tape Turing Machine". A. López-Ortiz. *Information Processing Letters*, v. 51, 1994, pp.311-314.
22. "Reasoning over Impossible Worlds". A. López-Ortiz. *Journal of Computing and Information*, Vol 1, 1995.

### **Conference Publications**

23. "Optimal Speedup on a Low-Degree Multi-Core Parallel", Reza Dorrigiv, A. López-Ortiz, and Alejandro Salinger. To appear in *Proceedings of 20th ACM Symposium on Parallelism in Algorithms and Architectures (SPAA)*, 2008.
24. "List Update with Locality of Reference", Spyros Angelopoulos, Reza Dorrigiv, and A. López-Ortiz. To appear in proceedings of 8<sup>th</sup> *Latin-American Conference on Informatics (LATIN)*, Lecture Notes in Computer Science, Springer Verlag, 2008.
25. "Experimental Evaluation of List Update Algorithms for Data Compression", Reza Dorrigiv, A. López-Ortiz and J. Ian Munro. To appear in *Proceedings of 2008 Data Compression Conference*, IEEE Computer Society, 2008.
26. "On Certain New Models for Paging with Locality of Reference", Reza Dorrigiv and A. López-Ortiz. To appear in proceedings of the *2008 Workshop on Algorithms and Computation (WALCOM)*, Lecture Notes in Computer Science, Springer Verlag, 2008.
27. "On the Relative Dominance of Paging Algorithms", Reza Dorrigiv, A. López-Ortiz, J. Ian Munro. To appear in *18<sup>th</sup> International Symposium on Algorithms and Computation (ISAAC)*, Lecture Notes in Computer Science, Springer Verlag, 2007.

28. "Reconstructing convex polygons and polyhedra from edge and face counts in orthogonal projections", Masud Hasan, Therese Biedl and A. López-Ortiz. To appear in proceedings of the *IARCS Annual Conference on Foundations of Software Technology and Theoretical Computer Science (FSTTCS)*, Lecture Notes in Computer Science, Springer Verlag, 2007.
29. "Search Algorithms for Unstructured Peer-to-Peer Networks", Reza Dorrigiv, A. López-Ortiz, Pawel Pralat. To appear in proceedings of the *32nd Annual IEEE Conference on Local Computer Networks (LCN)*, 2007.
30. "On the Separation and Equivalence of Paging Strategies", Spyros Angelopoulos, Reza Dorrigiv, and A. López-Ortiz. In Proceedings of *18th ACM-SIAM Symposium on Discrete Algorithms (SODA)*, 2007.
31. "Optimal Scheduling of Contract Algorithms for Any-time Problems", A. López-Ortiz, Spyros Angelopoulos and Angele Hamel. In Proceedings of *21st National Conference on Artificial Intelligence (AAAI-06)*.
32. "A Quadratic Propagator for the Inter-Distance Constraint", Claude-Guy Quimper, A. López-Ortiz, Gilles Pesant. In Proceedings of *21st National Conference on Artificial Intelligence (AAAI-06)*.
33. "Faster Adaptive Set Intersections for Text Searching". Jérémy Barbay, A. López-Ortiz, Tyler Lu. In Proceedings of *5th International Workshop on Experimental Algorithms (WEA)*, Lecture Notes in Computer Science 4007, Springer, pp. 146-157, 2006. Also **invited paper** to special issue of ACM Journal of Experimental Algorithmics (under submission).
34. "Cross-Stitching Using Little Thread". Therese Biedl, Joseph D. Horton, A. López-Ortiz. Proceedings of *16th Canadian Conference on Computational Geometry*, 2005.
35. "Sharper Upper and Lower Bounds for an Approximation Scheme for CONSENSUS-PATTERN". Broňa Brejová, Daniel G. Brown, Ian M. Harrower, A. López-Ortiz, Tomáš Vinař. Proceedings of *16th Annual Symposium on Combinatorial Pattern Matching, (CPM)*, 2005. Lecture Notes in Computer Science, 3537, Springer, pp. 1-10, 2005.
36. "Bandwidth reduction for video-on-demand broadcasting using secondary content insertion". Alexander Golynski, A. Lopez-Ortiz, Guillaume Poirier, Claude-Guy Quimper. Proceedings of *12th Annual Multimedia Computing and Networking (MMCN '05)*, pp. 167-175, 2005.
37. "Efficient View Point Selection for Silhouettes of Convex Polyhedra". Therese Biedl, Masud Hasan, A. López-Ortiz. Proceedings of *29th International Symposium on Mathematical Foundations of Computer Science (MFCS)*, Lecture Notes in Computer Science, 3153, Springer, pp. 735-747, 2004.
38. "Improved Algorithms for the Global Cardinality Constraint", Claude-Guy Quimper, A. Lopez-Ortiz, Peter van Beek, and Alexander Golynski. Proceedings of *10th International Conference on Principles and Practice of Constraint Programming (CP)*, Lecture Notes in Computer Science, 3258, Springer, 2004.
39. "Finding Frequent Items in Sliding Windows with Multinomially-Distributed Item Frequencies", Lukasz Golab, David DeHaan, A. López-Ortiz and Erik Demaine, Proceedings of *16th International Conference on Scientific and Statistical Database Management (SSDBM)*, IEEE Computer Society, pp. 425-426, 2004.
40. "The Cost of Cache-Oblivious Searching", Michael A. Bender, Gerth Stølting Brodal, Rolf Fagerberg, Dongdong Ge, Simai He, Haodong Hu, John Iacono and A. López-Ortiz. Proceedings of *Foundations of Computer Science (FOCS)*, pp. 271-282, 2003.
41. "On the Number of Distributed Measurement Points for Network Tomography", Joseph D. Horton, A. López-Ortiz. Proceedings of *ACM Internet Measurements Conference (IMC)*, pp. 204-209, 2003.
42. "Identifying Frequent Items in Sliding Windows over On-Line Packet Streams", Lukasz Golab, David DeHaan, Erik D. Demaine, A. López-Ortiz, and J. Ian Munro. Proceedings of *ACM Internet Measurements Conference (IMC)*, pp. 173-178, 2003.
43. "Optimal Dynamic Video-On-Demand using Adaptive Broadcasting". Therese Biedl, Erik D. Demaine, Alexander Golynski, Joseph D. Horton, A. López-Ortiz. Guillaume Poirier and Claude-Guy Quimper. Proceedings of *European Symposium on Algorithms (ESA)*, Lecture Notes in Computer Science 2832, Springer-Verlag, pp. 90-101, 2003.

44. "An Efficient Bound Consistency Algorithm for the Global Cardinality Constraint Problem". Claude-Guy Quimper, Peter van Beek, A. López-Ortiz, Alexander Golynski, and Samed B. Sadjad. Proceedings of *Constraint Programming (CP)*, Lecture Notes in Computer Science 2833, Springer-Verlag, pp. 600-614, 2003.
45. "A Fast and Simple Algorithm for Bounds Consistence of the Alldifferent Constraint". A. López-Ortiz, Claude-Guy Quimper, John Tromp and Peter van Beek. Proceedings of *Eighteenth International Joint Conference on Artificial Intelligence (IJCAI)*, pp. 245-250, 2003.
46. "Curves of Width One and the River Shore Problem". Timothy Chan, Alexander Golynski and A. López-Ortiz. Proceedings of *Canadian Conference on Computational Geometry*, pp. 73-75, 2003.
47. "Finding Hidden Independent Sets in Interval Graphs". Therese Biedl, Brona Brejová, Erik D. Demaine, Angele M. Hamel, A. López-Ortiz and Tomas Vinař. Proceedings of *9<sup>th</sup> Annual International Computing and Combinatorics Conference, (COCOON)*, Lecture Notes in Computer Science 2697, Springer-Verlag, pp. 182-191, 2003.
48. "Frequent Items in Sliding Windows". David DeHaan, Erik D. Demaine, Lukasz Golab, A. López-Ortiz, and J. Ian Munro. *DIMACS Workshop on Streaming Data Analysis*. DIMACS Center, Rutgers University, March 24 - 26, 2003.
49. "Curves of Minimum Width and the Asteroid Mapping Problem". Timothy Chan, Alexander Golynski, A. López-Ortiz and Claude-Guy Quimper. 12<sup>th</sup> Annual Video Review of Computational Geometry, Proceedings of *19<sup>th</sup> Annual ACM Symposium on Computational Geometry (SoCG)*, pp. 372-373, 2003.
50. "Frequency Estimation of Internet Packet Streams with Limited Space". Erik D. Demaine, A. López-Ortiz, and J. Ian Munro. Proceedings of *European Symposium on Algorithms (ESA)*, 2002, Lecture Notes in Computer Science 2461, 2002, pp. 348-360.
51. "Drawing  $K_{2,n}$ : A Lower Bound". Therese Biedl, Timothy Chan, A. López-Ortiz. Proceedings of *Canadian Conference on Computational Geometry*, pp. 146-148, 2002. (Also in *Information Processing Letters*).
52. "Searching for the Centre of a Circle". Therese Biedl, J.D. Horton, A. López-Ortiz, M. Hasan, T. Vinar. Proceedings of *Canadian Conference on Computational Geometry*, pp. 137-141, 2002.
53. "Robot Localization without Depth Perception". Erik D. Demaine, A. López-Ortiz and J. Ian Munro. Proceedings of *Scandinavian Workshop on Algorithm Theory, (SWAT)*, Lecture Notes in Computer Science 2368, pp. 249-259, 2002.
54. "On-line Parallel Heuristics and Robot Searching under the Competitive Framework". A. López-Ortiz and Sven Schuierer. Proceedings of *Scandinavian Workshop on Algorithm Theory, (SWAT)*, 2002. Lecture Notes in Computer Science 2368, pp. 260-269, 2002.
55. "A Linear Lower Bound on Index Size for Text Retrieval". Erik D. Demaine and A. López-Ortiz. Proceedings of *12<sup>th</sup> Symposium on Discrete Algorithms (SODA'2001)*, pp. 289-294, 2001.
56. "On Universally Easy Classes for NP-complete Problems". Erik D. Demaine, A. López-Ortiz and J. Ian Munro. Proceedings of *12<sup>th</sup> Symposium on Discrete Algorithms (SODA'2001)*, pp. 910-911, 2001. (Also in *Theoretical Computer Science*).
57. "Experiments on Adaptive Set Intersections for Text Retrieval Systems". Erik D. Demaine, A. López-Ortiz and J. Ian Munro. Proceedings of the *3rd Workshop on Algorithm Engineering and Experiments (ALENEX)*, Lecture Notes in Computer Science, pp. 91-104, 2001.
58. "Parallel Searching on a Lattice". A. López-Ortiz and G. Sweet. Proceedings of the *13<sup>th</sup> Canadian Conference on Computational Geometry*, pp.125-128, 2001.
59. "Online Routing in Convex Subdivisions". Prosenjit Bose, Andrej Brodnik, Svante Carlsson, Erik D. Demaine, Rudolf Fleischer, A. López-Ortiz, Pat Morin, and J. Ian Munro. Proceedings of the *11th Annual International Symposium on Algorithms and Computation (ISAAC 2000)*, Lecture Notes in Computer Science, Taipei, Taiwan, December 18-20, 2000. (Also in *International Journal of Computational Geometry and Applications*).
60. "A New Lower Bound for Kernel Searching". Peter Anderson, A. López-Ortiz. Proceedings of *12th Canadian Conference on Computational Geometry*, 2000.

61. "Adaptive Set Intersections, Unions and Differences". Erik D. Demaine, A. López-Ortiz, and J. Ian Munro. Proceedings of the 11<sup>th</sup> ACM-SIAM Symposium on Discrete Algorithms (SODA), pp. 743-752, 2000.
62. "Position Independent Street Searching". Christoph A. Bröcker, A. López-Ortiz, Proceedings of the Workshop on Algorithms and Data Structures (WADS), pp. 241-252, 1999.
63. "The Exact Cost of Exploring Streets with a CAB Strategy". A. López-Ortiz and Sven Schuierer. Proceedings of the 10<sup>th</sup> Canadian Conference on Computational Geometry, 1998.
64. "The Ultimate Strategy to Search on m-Rays?" A. López-Ortiz and Sven Schuierer. Extended abstract Proceedings of the 4<sup>th</sup> Annual International Computing and Combinatorics Conference, (COCOON'98), Lecture Notes in Computer Science 1449, Springer-Verlag, pp. 75-84, 1998. (Also in *Theoretical Computer Science*).
65. "Position-Independent Near Optimal Searching and On-line Recognition in Star Polygons". A. López-Ortiz and Sven Schuierer. Proceedings of the Workshop on Algorithms and Data Structures (WADS), Lecture Notes in Computer Science 1272, Springer-Verlag, 1997.
66. "Position-Independent Near Optimal Searching and On-line Recognition in Star Polygons". A. López-Ortiz and Sven Schuierer. Communication Proceedings of 13<sup>th</sup> ACM Symposium on Computational Geometry (SoCG), pp. 445-447, 1997.
67. "Generalized Streets Revisited", A. López-Ortiz and Sven Schuierer. Proceedings of the 4<sup>th</sup> European Symposium on Algorithms (ESA), Lecture Notes in Computer Science 1136, Springer-Verlag, pp. 546-558. 1996.
68. "Walking Streets Faster". A. López-Ortiz and Sven Schuierer. Proceedings of the 5<sup>th</sup> Scandinavian Workshop on Algorithms and Theory (SWAT), Lecture Notes in Computer Science 1097, Springer-Verlag, pp. 345-356, 1996.
69. "A Multi-collaborative Push-Caching Scheme for the WWW". A. López-Ortiz and Daniel Morales-Germán. Poster Proceedings of the 5<sup>th</sup> International World Wide Web Conference (approx. 60 talks, and 20 poster presentations), 1996.
70. "Going Home Through an Unknown Street". A. López-Ortiz and Sven Schuierer. Proceedings of the 4<sup>th</sup> Workshop in Algorithms and Data Structures (WADS), in Lecture Notes in Computer Science 955, Springer-Verlag, pp. 135-146, 1995.
71. "Simple, Efficient and Robust Strategies to Traverse a Street", A. López-Ortiz and Sven Schuierer. Proceedings of the 7<sup>th</sup> Canadian Conference on Computational Geometry, 1995.

### **Expository Papers**

72. "A Survey of Performance Measures for On-line Algorithms". Reza Dorrigiv and A. López-Ortiz. Invited survey, *SIGACT News*, Vol. 36, No. 3, September 2005.
73. "Algorithmic Foundations of the Internet". A. López-Ortiz. Invited survey, *SIGACT News*, Vol. 36, No. 2, June 2005.
74. Claude-Guy Quimper, Alejandro López-Ortiz: From Linear Relaxations to Global Constraint Propagation. CP 2005: 867
75. "Linear Pattern Matching of Repeated Substrings". A. López-Ortiz. *SIGACT News*. Vol. 25, No. 3, September 1994.
76. "Perl: A string processing language" (in Spanish). A. López-Ortiz and D. Morales-Germán. *Soluciones Avanzadas*, November, 1996.
77. "SGML: What is written on the blank spaces" (in Spanish). A. López-Ortiz and D. Morales-Germán. *Soluciones Avanzadas*, December, 1995.
78. "Computer Viruses" (in Spanish). A. López-Ortiz and D. Morales-Germán. *Newsletter of the Mexican Mathematical Society*, 1989.

79. Over a dozen monthly article contributions to the column “Weaving the Net” for *Soluciones Avanzadas*, Mexico, spanning 1995-1997, together with D. Morales-Germán and C. Iturriaga.
80. “Frequently Asked Questions (FAQ) about Theoretical Computer Science”. A. López-Ortiz. An introductory text for theoretical computer science. Usenet/Web document. 7 pages, 1998.

### **Submitted Papers**

81. “Faster Set Intersection Algorithms for Text Searching”. Jérémy Barbay, A. López-Ortiz, Tyler Lu, Alejandro Salinger. Invited submission to special issue of *ACM Journal of Experimental Algorithmics* on best papers from WEA’06.
82. “Sorting with Networks of Data Structures”, Therese Biedl, Alexander Golynski, Angèle M. Hamel, A. López-Ortiz and J. Ian Munro. Submitted to *Journal of Discrete and Applied Mathematics*, 2008.

### **Technical Reports**

83. “The Cooperative Ratio of On-line Algorithms”. Reza Dorrigiv and Alejandro López-Ortiz. *Technical Report*, CS-2007-39, School of Computer Science, University of Waterloo, 2006.
84. “Experimental Evaluation of List Update Algorithms for Data Compression”. Reza Dorrigiv, Alejandro López-Ortiz, and J. Ian Munro. *Technical Report*, CS-2007-38, School of Computer Science, University of Waterloo, 2007.
85. “List Update with Locality of Reference: MTF Outperforms All Other Algorithms”. Spyros Angelopoulos, Reza Dorrigiv, and Alejandro López-Ortiz. *Technical Report*, CS-2006-46, School of Computer Science, University of Waterloo, 2006.
86. “URL-Enhanced Adaptive Page-Refresh Models”. Robert Warren, Dana Wilkinson, Alejandro López-Ortiz. *Technical Report*, CS-2005-16, School of Computer Science, University of Waterloo, 2005.
87. “Finding Frequent Items in Sliding Windows with Multinomially-Distributed Item Frequencies”. Lukasz Golab, David DeHaan, Alejandro Lopez-Ortiz, and Erik D. Demaine, *Technical Report*, CS-2004-06, School of Computer Science, University of Waterloo, (updated version of CS-2003-06), 2004.
88. “An Efficient Bound Consistency Algorithm for the Global Cardinality Constraint Problem”. Claude-Guy Quimper, Peter van Beek, A. López-Ortiz, Alexander Golynski, and Samed B. Sadjad. *Technical Report*, CS-2003-10, School of Computer Science, University of Waterloo, 2003.
89. “Exploiting Statistics of Web Traces to Improve Caching Algorithms”. Alexander Golynski, A. López-Ortiz and Ray Sweidan. *Technical Report*, CS-2003-34, School of Computer Science, University of Waterloo, 2003.
90. “A fast and simple algorithm for bounds consistency of the alldifferent constraint problem” Alejandro Lopez-Ortiz, Claude-Guy Quimper, John Tromp and Peter van Beek. *Technical Report*, CS-2003-05, School of Computer Science, University of Waterloo, 2003.
91. “Towards Identifying Frequent Items in Sliding Windows”. David DeHaan, Erik D. Demaine, Lukasz Golab, Alejandro López-Ortiz, and J. Ian Munro. *Technical Report*, CS-2003-06, School of Computer Science, University of Waterloo, 2003.
92. “Frequency Estimation of Internet Packet Streams with Limited Space”. Erik D. Demaine, A. López-Ortiz, and J. Ian Munro. Massachusetts Institute of Technology, August 2002.
93. “Finding Hidden Independent Sets in Interval Graphs”. Therese Biedl, Brona Brejova, Erik D. Demaine, Angele M. Hamel, A. López-Ortiz and Tomas Vinar. *Technical Report*, CS-2001-26, Department of Computer Science, University of Waterloo, December 2001.
94. “High Arity Nodes, Routing and Internet Tomography”. J.D. Horton and A. López-Ortiz. *Technical Report*, TR01-143, Faculty of Computer Science, University of New Brunswick, July 2001.
95. “An  $\Omega(n \log^2 n / \log \log n)$  lower bound for Algorithm W in a synchronous fail-stop (no restart) PRAM”. A. López-Ortiz. Research Note. *Technical Report* TR00-128, Faculty of Computer Science, University of New Brunswick, January 2000.

96. "Position Independent Street Searching". Christopher A. Hipke, and A López-Ortiz. *Technical report* TR98-122, Faculty of Computer Science, University of New Brunswick, 1998.
97. "Adaptive Set Intersections". Erik D. Demaine, A. López-Ortiz, and J. Ian Munro. *Technical Report* TR 98-120, Faculty of Computer Science, University of New Brunswick, 1998.
98. "The Exact Cost of Exploring Streets with a CAB". A. López-Ortiz and Sven Schuierer. *Technical report* TR98-119, Faculty of Computer Science, University of New Brunswick, 1998.
99. "The Ultimate Strategy to Search on m-Rays?" A. López-Ortiz and Sven Schuierer. *Technical report* TR98-118, Faculty of Computer Science, University of New Brunswick, 1998.
100. "Going Home Through an Unknown Street". Ch. Icking, A. López-Ortiz, Sven Schuierer and I. Semrau. *Technical Report 228*, Department of Computer Science, FernUniversität Hagen, Germany, 1998. (A collection of improvements on [20] and the previous technical report of the same name).
101. "On-line Target Searching on Bounded and Unbounded Domains". A López-Ortiz. *Technical Report* CS-96-25, Department of Computer Science, University of Waterloo, 1996.
102. "A Multicollaborative Push-Caching HTTP Protocol for the WWW", A. Lopez-Ortiz and Daniel M. German. *Technical Report* CS-96-12, Dept. of Computer Science, Universtiy of Waterloo, 1996.
103. "Walking Streets Faster". A. Lopez-Ortiz and Sven Schuierer. *Technical Report* CS-95-20, Department of Computer Science, University of Waterloo, 1995.
104. "Going Home Through an Unknown Street" A. Lopez-Ortiz and Sven Schuierer. *Technical Report #445*, December 1994, Department of Computer Science, The University of Western Ontario. (Improved results appear on the paper of the same name in the Refereed Publications section above).
105. "Spanish Morphology for Automated Verb Declination". A López-Ortiz and D. Morales-Germán. *Technical Report* CS-96-12, Department of Computer Science, University of Waterloo, 1996.
106. "Probabilistic Complexity Classes", A. López-Ortiz. *Technical Report* CS-91-11. Department of Computer Science. University of Waterloo, 1991. Also in *Research Abstracts*, Structures in Complexity Theory, 1992.
107. "MP Particle Movement". José Luis Abreu, Martha Oliveró, María Garza and A. López-Ortiz. *Technical Report* 72. Institute of Applied Mathematics and Systems. Universidad Nacional Autónoma de México, 1987.

### **Articles in Preparation**

108. "Text Editing". Erik D. Demaine, T. Hagerup and A. López-Ortiz.
109. "New Bounds for Recognition of Star-Shaped Polygons". J.D. Horton, A. López-Ortiz and Sven Schuierer.
110. "On-line searching in General Polygons with Holes." P. Bose, A. López-Ortiz and Sven Schuierer.
111. "Striker/Defender Strategies for Soccer". J.D. Horton, A. López-Ortiz.
112. "Adaptive Algorithms for Boolean Query Evaluation in Text Retrieval Systems". Erik D. Demaine, A. López-Ortiz and J. Ian Munro.

### **Other Publications**

113. "Frequently Asked Questions in Mathematics". An introductory text for mathematics. Maintained Usenet/Web document. 86 pages. 1998.
114. "Computer Chess, Past and Present", An overview of the state of computer chess. University of Waterloo, *Imprint*, 1993.
115. "Frequently Asked Questions about Coffee and Caffeine". An introductory text to the chemistry of coffee and caffeine. 40 pages. 1998.

## **Training of Highly Qualified Personnel and Graduate Student Supervision**

### **Postdoctoral fellows**

1. Spyros Angelopoulos, September-December 2006.
2. Stephan Durocher (joint with Anna Lubiw and Timothy Chan), September 2007-to date.
3. Martin R. Ehmsen, September 2007-to date.

### **Current Graduate Students under Supervision**

1. Reza Dorrigiv. PhD student 2003-present
2. Alejandro Salinger. PhD Student 2006-present.
3. Andrew Curtis, PhD Student 2008-present.
4. Robert Frazer, PhD Student 2006-to date.

### **Doctoral Students Supervised**

1. Claude Guy-Quimper. PhD, July 2006. Thesis title: Efficient Propagators for Global Constraints.
2. Masud Hasan. PhD, September 2005. Co-supervision with Therese Biedl. Thesis title: Reconstruction and Visualization of Polyhedra using projections.
3. Adam Milstein, PhD Student, March 2008. Co-supervision with Dale Schuurmans. Thesis title: Improved Particle Filter Based Localization and Mapping Techniques.

### **Master Students Supervised**

1. Tony Abou-Assaleh, thesis reader and co-supervisor (with Dr. Nick Cercone), December 2001.
2. Bin Fu, A New Prefetching Interface for Newsgroups, June 2004 (UNB).
3. Xin Ma. Navigation and Searching on the Web Using a Visual System. December 2001.
4. Ooi Chee Wai. A Protocol for Online Discussion and Collaboration, January 2001.
5. Sharmila Mehendale. A study of Readability and Succinctness in Programming Languages, October, 2000.
6. Daoya Gong. Transaction Process Modeling and Implementation for 3-tiered Web-based Database Systems, April 2000.

### **Thesis Committee Membership**

**External Reader, PhD.** (1) Thomas Kamphans, University of Bonn, 2006. (2) S. Srinivasa Rao, Succinct Data Structures. Institute of Mathematical Sciences, University of Madras, 2002.

**PhD Thesis Committee.** Lukasz Golab (2006), Michael Spriggs (2006), Tarique Islam (2007), Reaz Ahmed (2007).

**PhD Second Stage Reader (excluding completed PhDs, listed above):** Zia Rahman (2006), Mark Petrick (2006), Mustaq Ahmed (2006), Aaditeshwar Seth (2006), Sonia Waharte (2006), Dalia Krieger (2007), Hamid Zarrabi-Zadeh (2007), Peyman Afshani (2007), Mustaq Ahmed (2007), Tyrel Russell (2007), Arash Farzan (2007).

**MMath Reader:** Meng He (2002), Ray Sweidan (2003), Fuping Huang (2003), Mohammad Ali Safari (2003), Tianshu Li (2003), Joe Capka (2004), Narad Rampersad (2004), Shabnam Aziza (2004), Eric Chen (2004), Wojciech Golab (2004), Mustaq Ahmed (2004), Yuhui Wen (2004), Arash Farzan (2004), Lars Hellsten (2004), Abdullah-Al Mahmood (2005), Neeraj Dumir (2005), Cristian Gaspar (2005), Huayue Wu (2006), Aleh Veraskouski (2007), Jesse McCrosky (2007), Zia Rahman (2007), Saeed Hassanpour (2007), Jaffer Gardezi (2008) plus reader for 5 master's thesis at UNB, 1998-2000.

### **Honours Thesis Supervised**

1. Peyman Imani. Web-based Disaster Recovery Planning, 2000.
2. Willem van Heiningen. Dynamic Gathering of Network Connectivity Information, 2000.
3. Peter Anderson. Kolmogorov Complexity of Lottery Results, 2000.
4. Haiyun Henry Wang. Java Search Library, 2000.
5. Wan Theng Lai. Interface for Java Search Library, 2000.
6. Ooi, Chee Wang. A Dynamic Robot Exclusion Protocol. 1998.
7. Vincent Lim. Push-Cache Support on the Apache Server, 1999.
8. Chris Dedam. AML: An Annotated Markup Language. 1999.
9. Janice McConnell. A comparison of Query Language Proposals for XML, 1999.
10. Craig Ryan. An introduction to lexicographical search trees, 1999.

### **Technical Reports Supervised**

11. Jason Thompson. Caching Services Using the Microsoft Proxy Server. 1999.
12. Bruce MacFarlane. Comparisons of Point Feature Labeling Algorithms. 1999.

### **NSERC Undergraduate Research Assistanships**

1. Tyler Lu, NSERC URA, Summer 2006, and continuing joint work thereafter (honorable mention in CRA undergrad award).

### **Undergraduate Research Assistanships**

2. Barbara Macdonald. Experiments in algorithms for data compression. Winter 2008.
3. William Finlay. The oCo programming language. Winter 2008.
4. Margareta Ackerman, Implementation of Schrieber's k-link algorithm, Winter 2006.
5. Tyler Lu, Interpolation Search Techniques, Summer 2005.
6. Tyler Lu, Adaptive Intersection Experiments, Winter 2005.
7. Mona Kabhazan, Robocup, Fall 2003.
8. Lei Chu, Robocup, Spring 2003.
9. Mona Kabhazan, Robocup, Spring 2003.
10. Stephen Corkey, Crash: computer game simulation, Winter 2003.
11. Dale Nesbitt, Subsumption and the Modification Method for the Marmoset automated theorem prover., Winter 2002.
12. Erick Moreno, Subsumption and the Modification Method for the Marmoset automated theorem prover., Winter 2002.
13. Samson Chi. Subsumption and the Modification Method for the Marmoset automated theorem prover., Winter 2002.
14. Michael Currie. An interactive command line shell for Linux. Winter 2002.
15. Cathy Lam, Soccer simulations, Spring 2002.
16. Lei Chu, Soccer simulations, Spring 2002.
17. Don Brin, Spring 2002.
18. Tina Huizhong Li, Data Structures for Editors, Spring 2002.

## Honours and Awards

### Research Grants

1. **NSERC Strategic Project Grant.** "Optimal Data Structures for Organization and Retrieval of Spatial Data". \$139,875 per annum from NSERC plus contributions in kind of \$61,100 in year 1, and \$21,100 in years 2 and 3 from CARIS (industrial partner). University of Waterloo, 2007-2009. PI: A. López-Ortiz, Co-applicants: J.Ian Munro (Waterloo), Bradford G. Nickerson (UNB), Norbert R. Zeh (Dalhousie). International Collaborators: Lars Arge (Aarhus, MADALGO Center).
2. **NSERC Discovery Grant.** "Efficient Algorithms for Massive Data Sets". \$29,000 per annum. University of Waterloo, 2007-2012.
3. **STG ORDCF.** "Caching Strategies for Multi-Core Architectures". Sun/Nortel/Government of Ontario, \$7,500 per annum. University of Waterloo, 2007.
4. **STG ORDCF.** "Caching Strategies for Multi-Core Architectures". Sun/Nortel/Government of Ontario, \$21,855 per annum. University of Waterloo, 2006-2007.
5. **STG ORDCF.** Cache Content Management. Sun/Nortel/Government of Ontario, \$20,000 per annum. University of Waterloo, Renewed for 2005-2006.
6. **STG ORDCF.** Cache Content Management. Sun/Nortel/Government of Ontario, \$20,000 per annum. University of Waterloo, 2004-2005.
7. **NSERC Discovery Grant.** "Algorithmic Foundations of the Internet, Information Retrieval and Robotics". \$25,000 per annum. University of Waterloo, 2003-2007.
8. **NSERC Research Grant.** \$14,700 per annum. University of New Brunswick/University of Waterloo, 1999-2003.
9. **Mathematics Endowment Fund.** \$1,600. Soccer Robocup, Spring 2003.
10. **Multimedia Metadata Project, Industry Canada.** Approx. \$38,000 for a metadata proposal for the SchoolNet project, 1999, Electronic Text Centre (P.I. Alan Burk).
11. **Canadian Foundation for Innovation.** Approx. \$142,000 grant for equipment and facilities of the Internet Computing Laboratory. University of New Brunswick, 1998-1999.
12. **IMASCO Young Scholars Award.** Approx. \$6,500 for research activities. University of New Brunswick, 1998.

### Awards, Medals and Distinctions

13. **UNB Merit Award.** Awarded annually to 12 faculty members from both UNB campuses, who have been assessed as particularly meritorious. University of New Brunswick, 1999-2000 (\$3,500).
14. **Student Leadership Award.** Awarded jointly by the Federation of Students and the Graduate Student Association of the University of Waterloo, 1993.
15. Selected for the **Student Achievement** recognition by the Board of Governors, University of Waterloo in 1993 and 1994.
16. **Gabino Barreda Medal,** awarded to the highest GPA (10 out of 10) among the 1988 class at the National University of México (Universidad Nacional Autónoma de México), 1989.
17. "**Best Student of Mexico**" Medal awarded by "El Nacional" journal. Mexico, 1989.

### Other Distinctions

1. **First Place** Stockmarket Competition. Fifty days of simulated stock trading in the Toronto Stock Exchange. University of Waterloo, 1995.
2. **Modern Art Museum,** Scientific photography exhibition in *La Memoria del Tiempo, 150 years of Photography in Mexico*, Mexico City, Mexico, 1990.
3. **Honorary Mention** in Science and Photography exhibition, 1987.
4. Member of the Mexican team for the **International Mathematics Olympiad**, held in La Havana, Cuba, 1987.

## Invited Presentations at Conferences, Panels, Distinguished Speaker Series

1. Distinguished Speaker, Analysis and Design of Algorithms for Multicore Architectures, Computer Science Division, INAOE, Puebla, México, 2008.
2. Invited speaker, *Workshop on Algorithms and Computation (WALCOM)*, Dhaka, Bangladesh, February 2008.
3. Adaptive, Online and Parameterized algorithms: three sides of the same coin. Plenary talk, *Summer School in Computer Science Series*, University of Chile, Valparaiso, Chile, January 2008.
4. Invited speaker, *Fourth Workshop on Combinatorial and Algorithmic Aspects of Networking*, (CAAN 2007), Halifax, August 2007.
5. Invited contribution, *22nd European Conference on Operational Research EURO XXII*. Online Search Selection and Rendezvous, Prague, July 2007.
6. Internet Panel, Intermex Conference, Mexico City, Mexico, 1995.
7. Kolmogorov Complexity, *XXV National Conference of the Mexican Mathematical Society*, Xalapa, México, 1992.

## Invited Seminars and Presentations

8. Analysis and Design of Algorithms for Multicore Architectures, Schloss Dagstuhl, Germany, Sem. 08081, February, 2008.
9. Measuring On-line Algorithms using the Cooperative Ratio, University of Southern Denmark, February, 2008.
10. Engineering a Set Intersection Algorithm for Information Retrieval. Yahoo Research Chile/University of Chile, January 2008.
11. On the Separation and Equivalence of Paging Strategies, Weizmann Institute, Israel, March, 2007.
12. On the Separation and Equivalence of Paging Strategies, Technion, Israel, March, 2007.
13. On the Separation and Equivalence of Paging Strategies, University of Haifa, Israel, March, 2007.
14. On the Separation and Equivalence of Paging Strategies, University of Toronto, February, 2007.
15. Alternative Models for Online Analysis. Schloss Dagstuhl, Germany, Sem. 06421, October, 2006.
16. On the Separation and Equivalence of Paging Strategies, Bertinoro Research Centre, Italy, June, 2006.
17. New Research Directions in Data Structures and Algorithms. Schloss Dagstuhl, Germany, Sem. 06091, February, 2006.
18. The Cost of Cache Oblivious Search. Schloss Dagstuhl, Germany, Sem. 04301, July, 2004.
19. Data Structures for Text Editors, Schloss Dagstuhl, Germany, Sem. 04091, February, 2004.
20. Alternatives to the Competitive Ratio Metric for On-line Navigation, Schloss Dagstuhl, Germany, Sem. 03501, December, 2003.
21. A Space Lower Bound for Index Size on Text Retrieval. MIT, October 2002.
22. Measuring traffic at the core of the Internet. University of New Brunswick, October, 2002.
23. Processor Scheduling for BFS/DFS Searches in Game Spaces. Algorithmic Combinatorial Game Theory, Schloss Dagstuhl, Germany, Sem. 2081, February, 2002.
24. Battleship and other Games on Interval Graphs. Algorithmic Combinatorial Game Theory, Schloss Dagstuhl, Germany, Sem. 2081, February, 2002.
25. Frequency counts on limited memory. Data Structures, Schloss Dagstuhl, Germany, Sem. 2091, March, 2002.
26. A Space Lower Bound for Index Size on Text Retrieval. University of Washington, Seattle, Washington, April, 2001.
27. On Roberto's First Problem. Data Structures, Schloss Dagstuhl, Germany, March 2000.
28. Caching protocols for the World Wide Web. IEEE CAS/COM. Telecom Applications Research Alliance, Halifax, November 1999.
29. On-line searching in Star Polygons, Universidad Politecnica de Cataluña, Barcelona, Spain, 1996.

30. Guessing vs. Coin Tossing. Department of Computer Science. University at Buffalo. Buffalo, NY, 1994.

## Professional Memberships

1. Association for Computing Machinery. Member. 1991-present.
2. IEEE Society. Member. Member. 1997-2007.
3. Mexican Mathematical Society. Member. 1982-2002.
4. Association for the Advancement of Artificial Intelligence, 2003-2004, 2006-2007.
5. American Mathematical Society. Member. 1989-1992.
6. Mexican Astronomical Society. Member. 1984-1985.

## Service

1. **Member.** Honorary degrees committee. Faculty of Mathematics, 2007-present.
2. **Member.** J.W. Graham Medal Committee, 2005-present.
3. **Member.** Faculty of Mathematics Representative Council, 2004-2006.
4. **Conference Chair and Local Arrangements Chair.** Workshop on Algorithms and Data Structures (WADS), 2005
5. **Chair.** Organizing Committee. 2<sup>nd</sup> Workshop on Combinatorial and Algorithmic Aspects of Networking, 2005.
6. **Co-Chair.** Workshops. IFIP Conference on Networking, 2005.
7. **Organization.**
  - a. Algorithms and Complexity Seminar, University of Waterloo, 2001-2003, 2004-present.
  - b. Algorithmic Problem Session (jointly with T. Biedl), University of Waterloo, 2001-2007.
8. **Member,** School of Computer Science, University of Waterloo
  - a. Computer Science Computing Facility Advisory Committee, 2006-present.
  - b. External Relations Committee, 2001-2005.
  - c. School Commons Committee, 2005-2006.
  - d. Graduate Committee, 2002-present.
9. **Chair.** Organizing Committee. Workshop on Linear Time Triangulation, May, 2000.
10. **Member.** Organizing Committee, 12<sup>th</sup> Canadian Conference in Computational Geometry, 1999-2000.
11. **Member.** Organizing Committee. Workshop on Combinatorial and Algorithmic Aspects of Networking, 2004.
12. **Judge.** Local Science Fair. Fredericton region, New Brunswick, 1999.
13. **Canadian Broadcasting Corporation (CBC) Radio Fredericton.** Interview. February, 2000.
14. **The Daily Gleaner.** Newspaper interview. 1999.
15. **Member.** Faculty of Computer Science. University of New Brunswick:
  - a. Graduate Committee, 1998-1999.
  - b. Curriculum Committee, 1998-2000.
16. **Mexican Usenet.** Responsible for the creation of the mex.\* Mexican news hierarchy, 1996.
17. **Member.** Nominating committee for Vice-President (Research), University of Waterloo, 1994.
18. **Chairperson.** Computer Science Graduate Student Association, University of Waterloo, 1994.
19. **Member, Board of Directors.** Graduate Student Association, University of Waterloo, 1993-1994.
20. **Chair.** International Graduate Student Committee, University of Waterloo. 1993-1994.

## **Additional Professional Activities**

### **Training**

**Instructor.** "XML: The universal data language". Two day introductory course for industry. Information Technology Centre, UNB, March 2000 and October 1999.

**Instructor.** An introduction to Computer Graphics. National University of Mexico, Spring 1988. University of Zacatecas, Summer 1988.

### **Industry Employment**

**Chief Scientist.** Discovery Engine. San Francisco, California. 11/2007-present.

**Director of Internet Research.** Management of five other researchers and prototyping of research projects for company wide deployment. Internap Network Services Corporation. 09/2000-08/2001.

**Research & Development.** Research Scientist (Senior Data Structures and Algorithms Specialist) for Open Text Corporation. Responsible for the design and implementation of advanced algorithms for text retrieval. 02/1996 –12/1997.

**Manager.** Search Engine Team, Open Text Corporation. 12/1996 –12/1997.

**Vice-President Technology.** Responsible for designing and overseeing the implementation of a corporate strategy for new media and the Internet. Reid Group, 1996-1997.

**Technical Translation and Marketing Strategy.** Waterloo Maple Software. Waterloo, Canada, 1993-1994.

**Technical Translation.** ESI Systems, Florida, 1993-1996.

**Unisys Fellowship.** An industrial/academic internship at Unisys Corporation's Mexican offices. 1988-1989.