CURRICULUM VITA

Andrew Rau-Chaplin

Professor
Faculty of Computer Science
Dalhousie University
6050 University Ave. Halifax, NS
Canada B3H 1W5 email:
arc@cs.dal.ca

1 Education

1.1 Post Doctoral Studies

1993/94 Postdoctoral Fellow, DIMACS Special Year on Massively Parallel Computation. DIMACS is a National Science Foundation Center, Co-administered by Princeton, Rutgers, Bellcore and AT&T Bell Labs

1.2 Degrees

May 93 Ph.D. Computer Science, Carleton University, Ottawa, Canada
On Parallel Data Structures and Parallel Geometric Applications for Multicomputers

Dec. 89 M.C.S. Computer Science (with distinction) Carleton University, Ottawa, Canada
Efficient Parallel Data Structures For Fine-Grained Hypercube Multiprocessors

Sep. 86 Bachelor Computer Science (Dean's honour roll) York University, Toronto, Canada
Honors project: *YPro: Enhancing The PROLOG Development Environment*

2 Research

2.1 Research Interests

My graduate students, collaborators, and I, pursue research projects that explore the application of parallel computing to data and computationally intensive problems. Our work is grounded in an algorithmic perspective, but we are committed to addressing the systems issues inherent in building working parallel applications, and performing systematic experimental evaluations. Recently, we have been focussed on applications in Data Warehousing, OLAP, Bioinformatics, and Risk Analytics.

KEYWORDS: Parallel computing: algorithms, applications, and architectures. Analysis of algorithms. Design, analysis and implementation of scalable parallel algorithms. Applications in Data Warehousing, OLAP, Bioinformatics, and Risk Analytics.

3 Publications

Papers in Refereed Journals

- O. Baltzer, F. Dehne, and A. Rau-Chaplin, "OLAP for Moving Object Data" to appear in *Int. J. Intelligent Information and Database Systems*.
- F. Dehne, T. Eavis, and A. Rau-Chaplin,"Parallel catastrophe modelling on a Cell B.E.", *Journal of Parallel, Emergent and Distributed Systems*, Volume 25, Number 5, Feb 2010, pages 401-410.
- F. Dehne, M. Lawrence, and A. Rau-Chaplin,"Cooperative Caching for Grid-Enabled OLAP", *Int. Journal of Grid and Utility Computing*, Volume 1, Number 2, Dec 2009, pages 169-18.
- F. Dehne, T. Eavis, and A. Rau-Chaplin,"RCUBE: Parallel Multi-Dimensional ROLAP Indexing", *Strategic Advancements in Utilizing Data Mining and Warehousing Technologies: New Concepts and Developments*, Jan 2009, pages 47-61.
- C. Hamilton and A. Rau-Chaplin,"Compact Hilbert indices: Space-filling curves for domains with unequal side lengths", *Information Processing Letters*, Volume 105, Number 5, Aug 2008, pages 155-163.
- M. Lawrence and A. Rau-Chaplin,"Dynamic View Selection for OLAP", *Int. Journal of Data Warehousing and Mining*, Volume 4, Number 1, Jan 2008, pages 47-61.
- G. Hickey, F. Dehne, A. Rau-Chaplin, and C. Blouin,"SPR Distance Computation for Unrooted Trees", *Evolutionary Bioinformatics*, Volume 4, Jan 2008, pages 17-27.
- Y.Chen, F. Dehne, T. Eavis, and A. Rau-Chaplin,"PnP: Sequential, external memory, and parallel iceberg cube computation", *Distributed and Parallel Databases*, Volume 23, Number 2, Jan 2006, pages 99-126.
- F. Dehne, T. Eavis, and A. Rau-Chaplin,"The cgmCUBE Project: Optimizing Parallel Data Cube Generation For ROLAP", *Distributed and Parallel Databases*, Sep 2004.
- Y. Chen, F. Dehne, T. Eavis, and A. Rau-Chaplin,"Improved Data Partitioning For Building Large ROLAP Data Cubes in Parallel", *International Journal of Data Warehousing and Mining*, Volume 2, Number 1, Aug 2004, pages 1-26.
- Y. Chen, F. Dehne, T. Eavis, A. Rau-Chaplin,"Parallel ROLAP Data Cube Construction On Shared-Nothing Multiprocessors", *Distributed and Parallel Databases*, Volume 15, Number 3, May 2004, pages 219-236.
- Y. Chen, F. Dehne, T. Eavis, and A. Rau-Chaplin,"Parallel ROLAP Data Cube Construction On Shared-Nothing Multiprocessors", *Distributed and Parallel Databases*, Volume 15, Number 3, May 2004, pages 219-236.
- F. Dehne, T. Eavis, and A. Rau-Chaplin,"RCUBE: Parallel Multi-Dimensional ROLAP Indexing", *Data Mining and Knowledge Discovery*, Mar 2003.
- J. Cheetham, F. Dehne, A. Rau-Chaplin, U. Stege, P. J. Taillon,"Solving Large FPT Problems On Coarse Grained Parallel Machines", *Journal of Computer and System Sciences*, Volume 67, Number 4, Mar 2003, pages 691-706.

- A. Ferreira, I. Guerin Lassous, K. Marcus, and A. Rau-Chaplin,"Parallel computation on interval graphs: algorithms and experiments", *Concurrency and Computation: Practice and Experience*, Volume 14, Number 11, Aug 2002, pages 885-910.

- M. Diallo, A. Ferreira, A. Rau-Chaplin,"A Note On Communication-Efficient Deterministic Parallel Algorithms for Planar Point Location and 2d Voronoi Diagram", *Parallel Processing Letters*, Volume 11, Number 2-3, Sep 2001, pages 327-340.

- F. Dehne, T. Eavis, S. Hambrusch and A. Rau-Chaplin,"Parallelizing The Data Cube", *Distributed and Parallel Databases (Special Issue on Parallel and Distributed Data Mining)*, Volume 11, Number 2, Sep 2001, pages 181-201.

- L. Boxer, Russ Miller, Andrew Rau-Chaplin,"Scaleable Parallel Algorithms for Geometric Pattern Recognition", *Journal of Parallel and Distributed Computing*, Volume 58, Number 3, Sep 1999, pages 466-486.

- A. Ferreira, C. Kenyon, A. Rau-Chaplin, and S. Ubeda,"Scalable Algorithms for the d-Dimensional Range Search on Coarse Grained Multicomputers", *ALGORITHMICA (Special Issue on Coarse Grained Parallel Algorithms)*, Volume 24, Number 3/4, Jul 1999, pages 195–208.

- A. Chan, F. Dehne, and A. Rau-Chaplin,"Coarse Grained Parallel Geometric Search", *Journal of Parallel and Distributed Computing*, Volume 57, Number 2, May 1999, pages 224-236.

- M. Diallo, A. Ferreira, A. Rau-Chaplin, and S. Ubeda,"Scalable 2d convex hull and triangulation algorithms for coarse grained multicomputers", *Journal of Parallel and Distributed Computing*, Volume 56, Number 1, Jan 1999, pages 47-70.

- L. Boxer, R. Miller, A. Rau-Chaplin,"Scaleable Parallel Algorithms for Lower Envelopes with Applications", *Journal of Parallel and Distributed Computing*, Volume 53, Number 2, Sep 1998, pages 91-118.

- A. Rau-Chaplin, B. MacKay-Lyons, T. Doucette, J. Gajewski, X. Hu, and P. Spierenburg,"Graphics support for a World-Wide-Web based architectural design service", *Computer Networks and ISDN Systems*, Volume 29, Number 14, Oct 1997, pages 1611-1623.

- F. Dehne, A. Fabri, and A. Rau-Chaplin,"Scalable Parallel Geometric Algorithms for Multicomputers", *International Journal of Computational Geometry and Applications*, Volume 6, Jan 1996, pages 379-400.

- F. Dehne, A. Ferreira, A. Rau-Chaplin,"Hypercube Algorithms for Parallel Processing of Pointer-Based Quadtrees", *Computer Vision and Image Understanding*, Volume 62, Number 1, Jul 1995, pages 1-10.

- F. Dehne, A. Ferreira, and A. Rau-Chaplin,"A massively parallel knowledge-base server using a hypercube multiprocessor", *Parallel Computing*, Volume 20, Jan 1994, pages 1369-1382.

- M. J. Atallah, F. Dehne, R. Miller, A. Rau-Chaplin, and J.-J. Tsay,"Multisearch techniques for implementing data structures on a mesh-connected computer", *Journal of Parallel and Distributed Computing*, Volume 20, Jan 1994, pages 1-13.

- F. Dehne, A. Fabri, M. Nassar, A. Rau-Chaplin, and R. Valiveti,"Construction of d-Dimensional Hyperoctrees on a Hypercube Multiprocessor", *Journal of Parallel and Distributed Computing*, Volume 23, Jan 1994, pages 256-261.

- L. Boxer, C.-S. Chang, R. Miller, and A. Rau-Chaplin,"Polygonal Approximation by Boundary Reduction", *Pattern Recognition Letters*, Volume 14, Jan 1993, pages 111-119.

- F. Dehne, A. Ferreira, and A. Rau-Chaplin,"Parallel fractional cascading on hypercube multiprocessors", *Computational Geometry: Theory and Applications*, Volume 2, Jan 1992, pages 141-167.

- F. Dehne, R. Miller, and A. Rau-Chaplin,"Optical Clustering on a Mesh-Connected Computer", *International Journal of Parallel Programming*, Volume 20, Number 6, Jan 1991, pages 475-486.

- F. Dehne, A. Ferreira, and A. Rau-Chaplin,"Parallel branch and bound on fine grained hypercube multiprocessors", *Parallel Computing*, Volume 15, Jan 1990, pages 201-209.

- F. Dehne and A. Rau-Chaplin,"Implementing data structures on a hypercube multiprocessor and applications in parallel computational geometry", *Journal of Parallel and Distributed Computing*, Volume 8, Number 4, Jan 1990, pages 367-375.

- S. Rabie, A. Rau-Chaplin, and T. Shibahara,"DAD: A Real-Time Expert System for the Monitoring of Data Packet Networks", *IEEE Network, Special Issue: Expert Systems in Network Management*, Volume 2, Number 5, Jun 1988, pages 29-34.

Papers in Refereed Conference Proceedings

- O. Baltzer, A. Rau-Chaplin, N. Zeh, "Building a Scalable Spatial OLAP System" in *ACM SAC Track on Advances in Spatial and Image-based Information Systems (ASIIS'13)*, Nov 2012.

- E. Mason, K. Shridhar, A. Rau-Chaplin, B. Varghese and N. Varshney, "Rapid Post-Event Catastrophe Modelling and Visualization" in *Proceedings of the Workshop of the 23rd International Conference on Database and Expert Systems Application (DEXA)*, IEEE Press, pages 10-15, Vienna, Austria, Oct 2012.

- A. K. Bahl, O. Baltzer, A. Rau-Chaplin and B. Varghese, "Parallel Simulations for Analysing Portfolios of Catastrophic Event Risk" in *Proceedings of the International SuperComputing Conference (SC12), Workshop on High Performance Computational Finance*, Salt Lake City, Utah, USA, Oct 2012.

- I. Patel, A. Rau-Chaplin and B. Varghese, "A Platform for Parallel R-based Analytics on Cloud Infrastructure" in *Proceedings of the International Workshop on Cloud Technologies for High Performance Computing (CloudTech-HPC) held in conjunction with 41st International Conference on Parallel Processing*, Pittsburgh, PA, USA, Sep 2012.

- F. Dehne, G. Hickey, A. Rau-Chaplin, and M. Byrne, "Parallel Catastrophe Modelling on a Cell Processor" in *Proceedings of the CASCON 2009 Workshops (CASCON 2009)*, Toronto, Canada, Nov 2009.

- O. Baltzer, F. Dehne, S. Hambrusch, and A. Rau-Chaplin, "OLAP for Trajectories" in *Proceedings of the 19th International Conference on Database and Expert Systems Application (DEXA 2008)*, Turin, Italy, Sep 2008.

- F. Dehne, T. Eavis, and A. Rau-Chaplin, "Efficient Computation of View Subsets" in *Proceedings of the 10th ACM International Workshop on Data Warehousing and OLAP (DOLAP 2007)*, Lisbon, Portugal, Nov 2007.

- J.-P. Deveaux, A. Rau-Chaplin, and N. Zeh, "Adaptive Tuple Differential Coding" in *Proceedings of the 18th International Conference on Database and Expert Systems Application (DEXA 2007)*, Regensburg, Germany, Sep 2007.

- F. Dehne, M. Lawrence, and A. Rau-Chaplin, "Cooperative Caching for Grid Based Data Warehouses" in *Proceedings of the Seventh IEEE International Symposium on Cluster Computing and the Grid 2007 (CCGRID '07)*, Rio de Janeiro, Brazil, May 2007.

- A. Cosgaya-Lozano, A. Rau-Chaplin, and N. Zeh, "Parallel Computation of Skyline Queries" in *Proceedings of the 21th International Symposium on High Performance Computing Systems and Applications (HPCS'07)*, Saskatoon, Canada, May 2007.

- C. H. Hamilton and A. Rau-Chaplin, "Compact Hilbert Indices for Multi-Dimensional Data" in *Proceedings of the First International Conference on Complex, Intelligent and Software Intensive Systems (CISIS'07)*, Vienna, Austria, Apr 2007.

- M. Lawrence, F. Dehne and A. Rau-Chaplin, "Implementing OLAP Query Fragment Aggregation and Recombination for the OLAP Enabled Grid" in *Proceedings of the 2007 IEEE International Parallel and Distributed Processing Symposium*, Long Beach, CA, USA, Mar 2007.

- M. Lawrence and A. Rau-Chaplin, "Dynamic View Selection for OLAP" in *Proceedings of the 8th International Conference on Data Warehousing and Knowledge Discovery (DaWaK 2006)*, Krakow, Poland, Sep 2006.

- M. Lawrence and A. Rau-Chaplin, "The OLAP-Enabled Grid: Model and Query Processing Algorithms" in *Proceedings of the 20th International Symposium on High Performance Computing Systems and Applications (HPCS'06)*, IEEE, Eds. R. Deupree, St. Johns, Canada, May 2006.

- Y. Chen, F. Dehne, T. Eavis, and A. Rau-Chaplin, "cgmOLAP: Efficient Parallel Generation and Querying of Terabyte Size ROLAP Data Cubes" in *Proceedings of the 22nd International Conference on Data Engineering*, IEEE, Atlanta, USA, Apr 2006.

- F. Dehne, T. Eavis, and A. Rau-Chaplin, "Querying ROLAP cubes in the presence of hierarchies" in *Proceedings of the 8th International Workshop on Data Warehousing and OLAP*, ACM, pages 89-96, Bremen, Germany, Nov 2005.

- C. Blouin, D. Butt, G. Hickey, and A. Rau-Chaplin, "Fast Parallel Maximum Likelihood-based Protein Phylogeny" in *Proceedings of the 18th International Conference on Parallel and Distributed Computing Systems*, ISCA, Las Vegas, USA, Sep 2005.

- P. Cox, S. Gauvin, A. Rau-Chaplin, "Adding Parallelism to Visual Data Flow Programs" in *Proceedings of the ACM Symposium on Software Visualization*, ACM, Saint Louis, USA, May 2005.

- A. Chan, C. Gao, and A. Rau-Chaplin, "A Coarse Grained Parallel Algorithm for Closest Larger Ancestors In Trees with Applications to Single Link Clustering" in *Proceedings of the International Conference on High Performance Computing and Communications (HPCC-05)*, Italy, May 2005.

- Y. Chen, F. Dehne, T. Eavis, A. Rau-Chaplin, "Building Large ROLAP Data Cubes in Parallel" in *Proceedings of the 8th International Database Engineering and Applications Symposium (IDEAS '04)*, IEEE, pages 367-377, Coimbra, Portugal, Jul 2004.

- Y. Chen, F. Dehne, T. Eavis, and A. Rau-Chaplin, "PnP: Parallel And External Memory Iceberg Cube Computation." in *Proceedings of the 21st International Conference on Data Engineering (ICDE 2005) (Short paper)*, IEEE, Tokyo, Japan, Jun 2004.

- F. Dehne, T. Eavis, and A. Rau-Chaplin, "Computing Partial Data Cubes" in *Data Warehousing and Business Intelligence Minitrack of the Thirty-Seventh Hawaii International Conference on System Sciences (HICSS-37)*, Jan 2004.

- J. Cheetham, F. Dehne, S. Pitre, A. Rau-Chaplin, and Peter Taillon, "Parallel CLUSTAL W For PC Clusters" in *Proceedings of the International Conference on Computational Sciences and Its Applications (ICCSA 2003)*, Volume 2668, Number 2, Lecture Notes in Computer Science, Springer Verlag, pages 300-309, Montreal, Canada, May 2003.

- F. Dehne, A. Rau-Chaplin, U. Stege, P. Taillon, "A Parallel FPT Application for Clusters" in *Proceedings of the 3rd IEEE/ACM International Symposuim on Cluster Computing and the Grid (CCGrid2003)*, pages 70–77, Tokyo, Japan, Oct 2002.

- F. Dehne, T. Eavis, and A. Rau-Chaplin, "Parallel Multi-Dimensional ROLAP Indexing" in *Proceedings of the 3rd IEEE/ACM International Symposuim on Cluster Computing and the Grid (CCGrid2003)*, pages 86–93, Tokyo, Japan, Oct 2002.

- Y. Chen, F. Dehne, T. Eavis, and A. Rau-Chaplin, "Parallel ROLAP Data Cube Construction On Shared-Nothing Multiprocessors" in *International Parallel and Distributed Processing Symposium (IPDPS2003)*, Nice, France, Oct 2002.

- F. Dehne, T. Eavis and A. Rau-Chaplin, "Computing Partial Data Cubes for Parallel Data Warehousing Applications" in *Proceedings of PVM-MPI 01*, Volume 2131, Lecture Notes in Computer Science, Springer Verlag, pages 319-326, Santorini, Greece, Sep 2001.

- F. Dehne, T. Eavis, and A. Rau-Chaplin, "Coarse Grained Parallel On-Line Analytical Processing (OLAP) For Data Mining" in *Proceedings of the 2001 International Conference on Computational Science (ICCS 2001)*, San Francisco, USA, May 2001.

- F. Dehne, T. Eavis, and A. Rau-Chaplin, "A Cluster Architecture for Parallel Data Warehousing" in *Proceedings of the 2001 IEEE International Symposium of Cluster Computing and the Grid (CCGRid'01)*, May 2001.

- F. Dehne, S. Hambrusch, T. Eavis, and A. Rau-Chaplin, "Parallelizing The Data Cube" in *Proceedings of the 8th International Conference on Database Theory (ICDT'01)*, London, UK, Jan 2001.

- M. Lamoureux and A. Rau-Chaplin, "Parallel Algorithms for Grounded Range Search and Applications" in *Proceedings of Europar'99*, Volume 1685, Lecture Notes in Computer Science, pages 525-532, Toulouse, France, Aug 1999.

- G. Powers and A. Rau-Chaplin, "An Agent Mediated Virtual Marketplace: In Context" in *Proceedings of Canadian Information Systems Conference*, Ottawa, Canada, Jan 1999.

- A. Ferreira, I. Guerin Lassous, K. Marcus, and A. Rau-Chaplin, "Parallel computation on interval graphs using pc clusters: Algorithms and experiments" in *Proceedings of Europar'98 (Distinguished Paper)*, Volume 1470, Lecture Notes in Computer Science, Springer Verlag, pages 875-886, Southampton, UK, Sep 1998.

- M. Diallo, A. Ferreira, A. Rau-Chaplin, "Communication-Efficient Deterministic Parallel Algorithms for Planar Point Location and 2d Voronoi Diagram" in *Proceedings of the 15th Symposium on Theoretical Aspects of Computer Science (STACS '98)*, Volume 1373, Lecture Notes in Computer Science, Springer Verlag, pages 399-409, Paris, France, Feb 1998.

- V. Alexandrov, F. Dehne, A. Rau-Chaplin, and K. Taft, "Coarse grained parallel Monte Carlo algorithms for solving SLAE using PVM" in *Proceedings of the 5th European PVM/MPI Users Group Meeting*, Springer LNCS 1497, pages 323-330, Jan 1998.

- A. Rau-Chaplin and T. Smedley, "A Graphical Language for Generating Architectural Forms" in *Proceedings of the 13th International IEEE Symposium on Visual Languages (VL'97)*, pages 260-267, Sep 1997.

- P. Spierenburg, A. Rau-Chaplin, B. MacKay-Lyons, "Recognizing Function within Architectural Forms" in *Proceedings of the International Conference on Artificial Intelligence and Soft Computing*, pages 9-12, Aug 1997.

- A. Ferreira, C. Kenyon, A. Rau-Chaplin, and S. Ubeda, "Scalable Algorithms for the d-Dimensional Range Search on Coarse Grained Multicomputers" in *Proceedings of the 11th International Parallel Processing Symposium (IPPS'97)*, pages 616-620, Apr 1997.

- A. Chan, F. Dehne, and A. Rau-Chaplin, "Coarse Grained Parallel Geometric Search" in *Proceedings of the 11th International Parallel Processing Symposium (IPPS'97)*, pages 320-325, Apr 1997.

- A. Rau-Chaplin, B. MacKay-Lyons, T. Doucette, J. Gajewski, X. Hu, and P. Spierenburg, "Graphics support for a World-Wide-Web based architectural design service" in *Proceedings of the 5th International Conference of Computational Graphics and Visualization Techniques (Compugraphics'96)*, pages 83-92, Dec 1996.

- R. Miller, L. Boxer, and A. Rau-Chaplin, "Some Scalable Parallel Algorithms for Geometric Problems" in *Proceedings of the 8th IASTED International Conference on Parallel and Distributed Computing Systems (PDCS'96)*, pages 426-430, Oct 1996.

- A. Rau-Chaplin, B. MacKay-Lyons, P. Spierenburg, "The LaHave House Project: Towards an Automated Architectural Design Service" in *Proceedings of the of the International Conference on Computer-Aided Design (CADEX'96)*, IEEE Computer Society Press, pages 25-31, Sep 1996.

- A. Rau-Chaplin, "Scalable Algorithm Design Techniques for Discrete Problems that Lack Obvious Structure" in *Proceedings of the of International Symposium on Parallel Computing for Solving Large Scale Irregular Applications (Stratagem'96)*, pages 5-15, Nice, France, Jul 1996.

- A. Ferreira, A. Rau-Chaplin, and S. Ubeda, "Scalable 2d convex hull and triangulation algorithms for coarse grained multicomputers" in *Proceedings of the 7th IEEE Symposium on Parallel and Distributed Processing (SPDP'95)*, pages 561-568, Jan 1995.

- F. Dehne, A. Fabri, and A. Rau-Chaplin, "Scalable Parallel Geometric Algorithms for Multicomputers" in *Proceedings of the ACM Symposium on Computational Geometry*, IEEE Press, pages 298-307, Jan 1993.

- F. Dehne, A. Fabri, M. Nassar, A. Rau-Chaplin, and R. Valiveti, "Construction of d-Dimensional Hyperoctrees on a Hypercube Multiprocessor" in *Proceedings of the 30th Annual Allerton Conference on Communication, Control and Computing*, pages 373-381, Jan 1992.

- F. Dehne and A. Rau-Chaplin, "Parallel Algorithms for color image quantization on hypercubes and meshes" in *Proceedings of the Workshop on Algorithms and Parallel VLSI Architectures II*, pages 91-96, Bonas (France), North Holland, Jan 1991.

- M. J. Atallah, F. Dehne, R. Miller, A. Rau-Chaplin, and J.-J. Tsay, "Multisearch techniques for implementing data structures on a mesh-connected computer" in *Proceedings of the ACM Symposium on Parallel Algorithms and Architectures (SPAA)*, pages 204-214, Hilton Head, South Carolina, Jan 1991.

- F. Dehne, A. Ferreira, and A. Rau-Chaplin, "Parallel processing of pointer based quadtrees" in *Proceedings of the International Conference on Parallel Processing*, pages 255-262, St. Charles, Ill, Jan 1991.

- F. Dehne, A. Ferreira, and A. Rau-Chaplin, "A massively parallel knowledge-base server using a hypercube multiprocessor" in *Proceedings of the IEEE International Conference on Tools for Artificial Intelligence*, IEEE Press, pages 660-666, Washington, D.C., Jan 1990.

- F. Dehne, A. G. Ferreira, and A. Rau-Chaplin, "Parallel AI algorithms for fine-grained hypercube multiprocessors" in *Proceedings of the International Workshop on Parallel Processing by Cellular Automata and Arrays (PARCELLA)*, pages 51-65, Berlin (Germany), Jan 1990.

- F. Dehne, A. Ferreira, and A. Rau-Chaplin, "Parallel branch and bound on a fine grained hypercube multiprocessor" in *Proceedings of the IEEE International Conference on Tools for Artificial Intelligence*, IEEE Press, pages 616-622, Herndon, VA, Jan 1989.

- F. Dehne, A. Ferreira, and A. Rau-Chaplin, "Parallel fractional cascading on a hypercube multiprocessor" in *Proceedings of the Allerton Conference on Communication, Control and Computing*, pages 1084-1093, Jan 1989.

- F. Dehne and A. Rau-Chaplin, "Implementing data structures on a hypercube multiprocessor and applications in parallel computational geometry" in *Proceedings of the International Workshop on Graphtheoretic Concepts in Computer Science (WG'89)*, Volume 411, Lecture Notes in Computer Science, Springer Verlag, Eds. M. Nagl, pages 316-329, Aachen (Germany), Jan 1989.

- S. Rabie, A. Rau-Chaplin, and T. Shibahara, "A Multi-Function/Multi-Paradigm Expert System For The Monitoring of Data Packet Networks" in *Proceedings of the IEEE Network Operations and Management Symposium (NOMS'88)*, IEEE Press, pages 29-34, New Orleans, Jan 1988.

Edited Proceedings and Other Publications

- F. Dehne, A. Rau-Chaplin, J.-R. Sack, and R. Tamassia (Editors),"Algorithms and Data Structures - Proceedings of the Workshop on Algorithms and Data Structures (WADS'97)", Halifax (Canada), 1997, Springer Verlag, Lecture Notes in Computer Science, Vol. 1272 , 1997, Aug 1997.

- A. Ferreira, and A. Rau-Chaplin (Editors),"Lecture Notes from the International Summer Institute on Parallel Discrete Algorithms", Technical Report TR21-96, Technical University of Nova Scotia, Aug 1996.

- F. Dehne, A. Ferreira, and A. Rau-Chaplin,"Algorithmique SIMD", M.Cosnard, M.Nivat, and Y.Robert (Editors), Algorithmique Parallle, Etudes et Recherches en Informatique, Masson, Jan 1992.

4 Professional Activities

4.1 Journal Editing

Associate Editor
Journal of Parallel and Distributed Computing (JPDC). 2011-Present.

Section Editors
Discrete Mathematics and Theoretical Computer Science. 2006 - Present.

4.2 Conference Organization

General Chair of Conference, Fifth Workshop on Algorithms and Data Structures (WADS'97), Halifax, Canada, Aug 1997.

Conference Co-Organizer, Summer Institute on Parallel Discrete Algorithms'96, Halifax, Canada, Jul 1996.

4.3 Program Committees

Member of Program Committee, Third DEXA Workshop on Information Systems for Situation Awareness and Situation Management, Prague, Czech Republic, Aug 2013.

Member of Program Committee, Workshop on Algorithms and Data Structures, London, Canada, Aug 2013.

Member of Program Committee, 2013 International Conference High Performance Computing and Simulation(HPCS 2013), Helsinki, Finland, Jul 2013.

Member of Program Committee, Tenth High-Performance Grid Computing Workshop, International Parallel and Distributed Processing Symposium (HPGC'13), Boston, USA, May 2013.

Member of Program Committee, Third International Conference on Cloud Computing and Services Science (CLOSER 2013), Aachen, Germany, May 2013.

Member of Program Committee, Fourteenth International Conference on High Performance Computing and Communications (HPCC-2012), Liverpool, England, Jun 2012.

Member of Program Committee, Ninth High-Performance Grid Computing Workshop, International Parallel and Distributed Processing Symposium (HPGC'12), Shanghai, China, May 2012.

Member of Program Committee, Second International Conference on Cloud Computing and Services Science, Porto, Portugal, Apr 2012.

Member of Program Committee, Eighteenth IEEE International Conference on High Performance Computing (HiPC), Bangalore, India, Dec 2011.

Member of Program Committee, Thirteenth IEEE Int. Conference on High Performance Computing and Communications (HPCC 2011), Banff, Canada, Sep 2011.

Member of Program Committee, Eighth High-Performance Grid Computing Workshop, International Parallel and Distributed Processing Symposium (HPGC'11), Anchorage, Alaska, May 2011.

Member of Program Committee, International Conference on Cloud Computing and Services Science (CLOSER 2012), Noordwijkerhout, The Netherlands, May 2011.

Member of Program Committee, Seventeenth IEEE High-Performance Computing Conference (HiPC'10), Goa, India, Dec 2010.

Member of Program Committee, IEEE Cluster Computing Conference (Cluster 2010), Crete, Greece, Sep 2010.

Member of Program Committee, 2010 International Conference High Performance Computing and Simulation(HPCS 2010), Caen, France, Jun 2010.

Member of Program Committee, 10th IEEE International Workshop on High Performance Computational Biology (HiCOMB 2010), Atlanta, USA, Apr 2010.

Member of Program Committee, Seventh High-Performance Grid Computing Workshop, International Parallel and Distributed Processing Symposium (HPGC'10), Atlanta, USA, Apr 2010.

Member of Program Committee, 16th International Conference on High Performance Computing (HiPC 2009), Kochi (Cochin), India, Dec 2009.

Member of Program Committee, 13th International Conference on Knowledge-based and Intelligent Information and Engineering Systems (KES 2009), Santiago, Chile, Sep 2009.

Member of Program Committee, 10th International Conference on Data Warehousing and Knowledge Discovery (DaWak 2008), Turin, Italy, Sep 2008.

Member of Program Committee, 12th International Conference on Knowledge-based and Intelligent Information and Engineering Systems (KES 2008), Zagreb, Croatia, Sep 2008.

Member of Program Committee, 2008 International Conference High Performance Computing and Simulation(HPCS 2008), Nicosia, Cyprus, Jun 2008.

Member of Program Committee, 5th Workshop on High Performance Grid Computing (HPGC'08), Miami, USA, Apr 2008.

Member of Program Committee, Second International Conference on Complex, Intelligent and Software Intensive Systems (CISIS-2008), Barcelona, Spain, Mar 2008.

Member of Program Committee, Ninth International Conference on Data Warehousing and Knowledge Discovery (DaWaK 2007), Regensburg, Germany, Sep 2007.

Member of Program Committee, Third International Conference on High Performance Computing and Communications (HPCC07), Houston, USA, Sep 2007.

Member of Program Committee, Eighth Workshop on Algorithms and Data Structures (WADS'07), Halifax, Canada, Aug 2007.

Member of Program Committee, International Conference on Complex, Intelligent and Software Intensive Systems (CISIS-2007), Vienna, Austria, Apr 2007.

Member of Program Committee, Third International Advanced Database Conference (IADC-2007), San Diego, USA, Apr 2007.

Member of Program Committee, Fourth High-Performance Grid Computing Workshop (HPGC '07), Long Beach, USA, Mar 2007.

Member of Program Committee, Thirteenth IEEE International Conference on High Performance Computing, Bangalore, India, Dec 2006.

Member of Program Committee, Tenth International Database Engineering and Applications Symposium (IDEAS '06), Delhi, INDIA, Dec 2006.

Member of Program Committee, Second International Conference on High Performance Computing and Communications (HPCC-06), Munich, Germany, Sep 2006.

Member of Program Committee, Seventeenth International Conference on Database and Expert Systems Applications (DEXA '06), Krakow, Poland, Sep 2006.

Member of Program Committee, High Performance Computing and Simulation Conference (HPC/S 2007), Bonn, Germany, May 2006.

Member of Program Committee, The 2006 High Performance Computing and Simulation Conference (HPC/S '06), Bonn, Germany, May 2006.

Member of Program Committee, Third High-Performance Grid Computing Workshop (HPGC '06), Rhodes Island, Greece, Apr 2006.

Member of Program Committee, Twelth European Conference on PVM/MPI and their applications (Euro PVM/MPI 2005), Capri-Sorrento Peninsula, Italy, Sep 2005.

Member of Program Committee, Eighteenth International Conference on Parallel and Distributed Computing Systems (PDCS-2005), Las Vegas, USA, Sep 2005.

Member of Program Committee, Seventh Workshop on Algorithms and Data Structures (WADS'05), Waterloo, Canada, Aug 2005.

Member of Program Committee, High Performance Computing and Simulation Conference (HPC/S 2005), Riga, Latvia, Jun 2005.

Member of Program Committee, Eleventh Australasian Theory Symposium (CATS'05), Newcastle, Australia, Jan 2005.

Member of Program Committee, Eleventh European Conference on PVM/MPI and their applications (Euro PVM/MPI 2004), Budapest, Hungary, Sep 2004.

Member of Program Committee, Seventeenth International Conference on Parallel and Distributed Computing Systems (PDCS-2004), San Francisco, USA, Sep 2004.

Member of Program Committee, Eighteenth Annual International Symposium on High Performnce Computing Systems and Applications (HPCS 2003), Winnipeg, Canada, May 2004.

Member of Program Committee, Tenth EuroPVM/MPI(EuroPVM/MPI 2003), Venice, Italy, Sep 2003.

Member of Program Committee, Seventh Workshop on Algorithms and Data Structures (WADS'03), Ottawa, Canada, Jul 2003.

Member of Program Committee, Seventeenth Annual International Symposium on High Performnce Computing Systems and Applications (HPCS 2003), Sherbrooke, Canada, May 2003.

Member of Program Committee, Ninth European Conference on PVM/MPI and their applications (Euro PVM/MPI 2002), Linz, Austria, Sep 2002.

Member of Program Committee, 16th Annual High Peformance Computing Symposium (HPCS'2002), Moncton, Canada, Jun 2002.

Member of Program Committee, Eighth European Conference on PVM/MPI and their applications (Euro PVM/MPI 2001), Santorini, Greece, Sep 2001.

Member of Program Committee, Cascon2000: Meeting of Minds, Toronto, Canada, Nov 2000.

Member of Program Committee, Seventh European Conference on PVM/MPI and their applications (Euro PVM/MPI 2000), Lake Balaton, Hungary, Sep 2000.

Member of Program Committee, Sixth European Conference on PVM/MPI and their applications (Euro PVM/MPI 1999), Barcelona, Spain, Sep 1999.

Member of Program Committee, Sixth Workshop on Algorithms and Data Structures (WADS'99), Vancouver, Canada, Aug 1999.

Member of Program Committee, Fifth European Conference on PVM/MPI and their applications (Euro PVM/MPI 1998), Liverpool, England, Sep 1998.

Member of Program Committee, Fifth International Symposium on Solving Irregularly Structured Problems in Parallel (IRREGULAR'98), Berkeley, CA, USA, Aug 1998.

Member of Program Committee, Tenth International Conference on Computing and Information (ICCI'98), Winnipeg, Manitoba, Jun 1998.

Co-Chair of Program Committee, Fifth Workshop on Algorithms and Data Structures (WADS'97), Halifax, Canada, Aug 1997.

4.4 Peer Review

Canadian Association for Computer Science
Member of CACS/AIC Awards Committee 2012-2013.

NSERC Grant Selection Committee
Chair of NSERC grant selection committee 331 for granting year 2002 - 2003.

NSERC Grant Selection Committee
NSERC grant selection committee 331 for granting years 2000 - 2002.

NSERC Major Facilities Access Grant
Member of adhoc Major Facilities Access Grant committee that reviewed and approved startup funding for the Banff International Research Station for Mathematical Innovation and Discovery in June of 2001.

Advisor, Members of the College of Reviewers
Canadian Foundation for Inovation (CFI) New Opportunities Fund (4 reviews).

Grant Reviewer
Numeric, Symbolic and Geometric Computations Program of the National Science Foundation (USA).

Referee
For journals and conferences including Pattern Recognition Letters, Parallel Processing Letters, Information Processing Letters (IPL), International Journal of Foundations of Computer Science, Algorithmica, Journal of Parallel and Distributed Processing, Int. Parallel Processing Symp., and Computational Geometry: Theory and Applications.

External Reviewer
For British ministry of education funding of a new European Masters program to be hosted by the University of Reading.

Grant Reviewer
NSERC Discovery Grants Program.

External Examiner
Ph.D. students and University of New Brunswick.

5 Contributions to the Training of Highly Qualified Personnel

5.1 Research Interns and Postdocs Supervision

- **Blesson Varghese**, Postdoctoral Fellow. Research topic: High Performance Computing for Risk Analytics. Jan 2012 - Jan 2014.
- **Li Li**, M.Sc. Research topic: Outlier Detection Techniques for Reinsurance Analytics. Sep 2012 - Sep 2013.
- **Allie Strel**, B.Sc. Research topic: Understanding unmodeled Catastrophe Risk. Jun 2012 - Sep 2012.
- **Yue Guan**, M.Sc. Research topic: GIS for Risk Data Warehousing. Jun 2012 - Sep 2012.
- **Anthony Astoul**, B.Sc. Research topic: Global Earthquake Visualization. Jun 2012 - Aug 2012.
- **Aman Bahl**, M.C.S. Research topic: Aggregate Risk Analysis on GPUs and Multicore Processors. May 2012 - Aug 2012.
- **Xin Wang**, M.Sc. Research topic: Statistical Methods in Risk Analytics. Jan 2012 - Aug 2012.
- **Christopher Filliter**, B.Sc. Research topic: Earthquake loss model validation. May 2012 - Jun 2012.

5.2 Graduate Student and Honours Supervision

- **Kong Quan**, M.C.S. candidate. Expected graduation May 2014. Thesis topic: Real-time Parallel In-Memory Analytics. (Supervisor)
- **Zhimin Yao**, M.C.S. candidate. Expected graduation May 2014. Thesis topic: Big data approaches to risk analytics. (Co-Supervisor)
- **Udaya Raj Adhikari**, M.C.S. candidate. Expected graduation Jan 2014. Thesis topic: High Performance Computing for Dynamic Financial Analysis. (Supervisor)

- **Ishan Patel**, M.C.S. candidate. Expected graduation Aug 2011. Thesis topic: Cloud Infrastructure for Analytics. (Supervisor)
- **Zhimin Yao**, B.C.S. Awarded Aug 2012. Thesis title: "Simulation Techniques for Aggregate Risk Analysis". (Supervisor)
- **Eric Mason**, B.C.S. Awarded Aug 2012. Thesis title: "A Data Management System for Spatial Subdivision Hierarchies". (Supervisor)
- **Naman Varshney**, M.C.S. Awarded May 2012. Thesis title: "Visualization Support for a realtime Global Earthquake Catastrophe Model". (Supervisor)
- **Kunal Shridhar**, M.C.S. Awarded May 2012. Thesis title: "A realtime Catastrophe Model for Global Earthquake". (Supervisor)
- **Adan Cosgaya**, Ph.D. Awarded Sep 2011. Thesis title: "Engineering Algorithms for Solving Geometric and Graph Problems on Large Data Sets". (Co-Supervisor)
- **Oliver Baltzer**, Ph.D. Awarded Sep 2011. Thesis title: "Parallel Spatial OLAP". Position on graduation: Ph.D. Student. (Supervisor)
- **Jae-Hyun Paek**, M.C.S. Awarded Mar 2011. Thesis title: "Privacy-Enhanced Public Name-Authority System for Building Research Communities". Position on graduation: Software Engineer FlagstoneRe. (Supervisor)
- **Naureen Nizam**, M.C.S. Awarded May 2007. Thesis title: "Parallel Methods for Genetic Linkage Analysis". (Co-Supervisor)
- **Glenn Hickey**, M.Sc. Awarded Sep 2006. Thesis title: "Parallel Methods for Phylogeny". (Co-Supervisor)
- **Micheal Lawence**, M.Sc. Awarded Sep 2006. Thesis title: "The OLAP Enabled Grid". Position on graduation: Ph.D. Student. (Supervisor)
- **Bin He**, M.Sc. Awarded May 2006. Thesis title: "Parallel Emergency Monitoring". (Supervisor)
- **Micheal Atherton**, M.C.S. Awarded Aug 2005. Thesis title: "Parallel Star Cube Generation". Position on graduation: Masters Student. (Supervisor)
- **Jean-Paul Deveaux**, M.C.S. Awarded Aug 2005. Thesis title: "Adaptive Tuple Differential Coding in Statistical Datasets". (Co-Supervisor)
- **Xiong Zhou**, M.E.C Awarded May 2005. Thesis title: "OLAP Benchmarks". (Supervisor)
- **Ying Chen**, Ph.D. Awarded Sep 2004. Thesis title: "Parallel Data Mining". Position on graduation: Ph.D. Student. (Supervisor)
- **Micheal Lawence**, B.Sc. Awarded Sep 2004. Thesis title: "Online Algorithms for View Selection". Position on graduation: Masters Student, Dalhousie University. (Supervisor)
- **Chistopher Rafuse**, B.C.S. Awarded Sep 2004. Thesis title: "Selecting Designs in Generated Design Spaces". Position on graduation: Masters Student. (Supervisor)
- **Lingyan Zhang**, M.C.S. Awarded Sep 2004. Thesis title: "Parallel Automatic Term Extraction From Large Web Corpora". Position on graduation: Ph.D. Student. (Co-Supervisor)

- **Davin Butt**, B.Sc. Awarded Aug 2004. Thesis title: "Parallel Methods for Maximum Likelyhood Phylogeny". Position on graduation: Masters Student, Dalhousie University. (Co-Supervisor)
- **Chunmei Gao**, M.C.S. Awarded Apr 2004. Thesis title: "Parallel Single-link Cluster on Coarse-Grained Multicomputers". Position on graduation: Software Engineer. (Supervisor)
- **Joshua Seib**, M.C.S. Awarded Dec 2003. Thesis title: "Efficient Generation of Partial Datacubes". Position on graduation: Academic Computing, Dalhousie University. (Supervisor)
- **Todd Eavis**, Ph.D. Awarded Aug 2003. Thesis title: "Parallel Relational OLAP". Position on graduation: Assistant Professor, Concordia University. (Supervisor)
- **Oliver Baltzer**, M.C.S. Awarded May 2003. Thesis title: "Parallel Applicaion Design". Position on graduation: Masters Student. (Supervisor)
- **Chad Seaward**, M.C.S. Awarded Apr 2003. Thesis title: "From Symbolic to Materialized Design Models". Position on graduation: Clear Picture Corporation. (Supervisor)
- **Rania Hamouda**, M. Arch. Awarded Dec 2002. Thesis title: "An Acoustic Design System". Position on graduation: Masters Student. (Co-Supervisor)
- **James Dean-Moore**, M.C.S. Awarded Dec 2001. Thesis title: "Parallel Segment Tree". Position on graduation: Imbedded Systems Design, AMIRIX. (Supervisor)
- **Yan Li**, M.C.S. Awarded Jun 2001. Thesis title: "A Query Driven User Interface to an Architectural Design Data Base". (Supervisor)
- **Thomas Pehle**, Diplom-Ingenieur Awarded Mar 2001. Thesis title: "A Software Architecture for Parallel Data Mining". Position on graduation: Fachhochschule Fur Technik und Wirtschaft Berlin. (Co-Supervisor)
- **Quingcai Wei**, M.C.S. Awarded Dec 1999. Thesis title: "Development of an Extensible Web Based Faculty Information System". (Supervisor)
- **Philip Mak**, M.C.S. Awarded Jun 1999. Thesis title: "An application of Genetic Algorithms to a Function Allocation Problem". Position on graduation: Ph.D. Student, George Washington University. (Supervisor)
- **Weihua He**, M.C.S. Awarded Dec 1998. Thesis title: "A Java Based Architectural Design Tool Based on ODBC Access to a Geometric Database". Position on graduation: Nortel Networks. (Supervisor)
- **G-Y. Cao**, M.C.S. Awarded Dec 1998. Thesis title: "Representation and Manipulation of Geometric and Architectural Data Stored in a Relational Database". Position on graduation: IBM Research Toronto. (Supervisor)
- **Greg Powers**, M.C.S. Awarded Sep 1998. Thesis title: "Agents in Context". Position on graduation: DMR Consulting. (Supervisor)
- **Peter Spierenburg**, M.C.S. Awarded Dec 1997. Thesis title: "Design Generation: Form + Function". Position on graduation: Lecturer St. Mary's University and Ph.D. Student. (Supervisor)
- **Andrew Gajewski**, M.C.S. Awarded Sep 1997. Thesis title: "On-The-Fly Creation of 3D Architectural Models in VRML". Position on graduation: Quickeys. (Supervisor)

- **Liren Yan**, M.C.S. Awarded Feb 1997. Thesis title: "Generation and Visualization of 3D Architectural Models in VRML". Position on graduation: Nortel Networks. (Supervisor)
- **Xiangqun Hu**, M.C.S. Awarded Feb 1997. Thesis title: "Development and Evaluation of a Web-based Architectural Design Tool". Position on graduation: IBM Research Toronto. (Supervisor)
- **Hong Ning**, M.C.S. Awarded Sep 1996. Thesis title: "A constraint-based editor for modular houses". Position on graduation: Pictorious. (Supervisor)
- **P. Godbole**, M.C.S. Awarded Jan 1996. Thesis title: "Multimedia Design Techniques". Position on graduation: System House. (Supervisor)
- **Ihab Moawad**, M.C.S. Awarded Dec 1995. Thesis title: "Sphinx: A Novel Switch Architecture For Asynchronous Transfer Mode (ATM) Networks". Position on graduation: Nortel Networks. (Co-Supervisor)

6 Teaching Experience

6.1 Courses Taught - Dalhousie/TUNS

CS3110 Introduction to Algorithms. Winter 2013.

CSci2110 Computer Science III - Data Structures. Winter 2013.

CSci6702 Parallel Computing. Fall 2012.

CSci3130 Software Engineering. Summer 2012.

CSci6702 Parallel Computing. Winter 2012.

Risk Analytics Risk Analytics (Special Topics). Fall 2011.

CSci3130 Software Engineering. Winter 2011.

CSci3130 Software Engineering. Winter 2010.

CSci6702 Parallel Computing. Fall 2009.

CSci2110 Computer Science III - Data Structures. Winter 2007.

CSci2110 Computer Science III - Data Structures. Fall 2006.

CSci6702 Parallel Computing. Fall 2006.

CSci2110 Computer Science III - Data Structures. Winter 2006.

CSci6702 Parallel Computing. Fall 2005.

CSci2110 Computer Science III - Data Structures. Fall 2005.

CSci6702 Parallel Computing. Fall 2004.

CSci2110 (Section 2) Computer Science III - Data Structures. Fall 2004.

CSci2110 (Section 1) Computer Science III - Data Structures. Fall 2004.

CSci6702 Parallel Computing. Fall 2003.

CSci2110 (Section 1) Computer Science III - Data Structures. Fall 2003.

CSci2110 (Section 2) Computer Science III - Data Structures. Fall 2003.

CSci3110 Introduction to Algorithms. Summer 2003.

CSci6702 Parallel Computing. Summer 2003.

CSci3110 Introduction to Algorithms. Summer 2002.

CSci6702 Parallel Computing. Summer 2002.

ECMM6000 (Executive) Global Electronic Commerce. Fall 2001.

ECMM6000 (Executive) Global Electronic Commerce. Fall 2000.

ECMM6000 Global Electronic Commerce. Fall 2000.

ECMM6000 Global Electronic Commerce. Fall 1999.

CSci1200 Computer Science for Non Majors. Fall 1999.

CSci3110 Introduction to Algorithms. Summer 1999.

CSci6702 Parallel Computing. Summer 1999.

CSci1200 Computer Science for Non Majors. Fall 1998.

CSci6901 Directed Studies. Fall 1998.

CSci3110 Introduction to Algorithms. Summer 1998.

CSci6702 Parallel Computing. Summer 1998.

CS6056 Analysis of Algorithms. Fall 1997.

CS6089 Parallel Computing. Summer 1997.

CS3110 Introduction to Algorithms. Summer 1997.

CS6056 Analysis of Algorithms. Fall 1996.

CS4111 Design and Analysis of Parallel Algorithms. Fall 1996.

CS6089 Parallel Computing. Summer 1996.

CS3110 Introduction to Algorithms. Summer 1996.

CS6090 Computer Mediated Design. Fall 1995.

CS6056 Analysis of Algorithms. Fall 1995.

CS3110 Introduction to Algorithms. Summer 1995.

CS6089 Parallel Computing. Summer 1995.