

# Michael Lawrence

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## Summary and Objective

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Eight years software development and computer science research experience. I aim to apply analytical skills and modern research methods to the design and implementation of database systems. This includes the creation of software for analysis, management, integration and mining of heterogeneous databases.

## Education

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*University of British Columbia*      *PhD, Computer Science*      *09/2006-09/2012*  
*(Expected)*

Thesis: Coordination of updates between heterogeneous databases.  
Supervisor: Dr. Rachel Pottinger

*Dalhousie University*      *Master of Computer Science*      *09/2004-10/2006*  
*GPA 4.3/4.3*

Thesis: An architecture and caching strategies for grid-enabled OLAP  
Supervisor: Dr. Andrew Rau-Chaplin

*Dalhousie University*      *Bachelor of Computer Science,*      *09/2000-10/2004*  
*GPA 3.98/4.3*      *First Class Honours*

Thesis: Online selection of aggregate views in an OLAP data warehouse  
Supervisor: Dr. Andrew Rau-Chaplin

## Experience

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*Graduate Research Assistant*      *Dept. of Computer Science,*      *09/2006-Present*  
*Supervisor: Dr. Rachel Pottinger*      *University of British Columbia*

- Designed and implemented algorithms for mapping and translating updates between heterogeneous data sources with vastly different structures/semantics.
- We studied the application of our methods in the context of coordinating real-world building designs with detailed cost estimates in large construction projects.

*Research Programmer*      *Sauder School of Business*      *11/2009-Present*  
*Supervisor: Dr. Steven Shechter*      *University of British Columbia*

- Designed and implemented a discrete time simulation of a transplant waiting list for evaluation of multiple patient screening policies.
- Designed and implemented a simulation for evaluating screening and decision policies for initiating dialysis in kidney transplant patients. Both simulations have been validated on real-world data.
- Enhanced and extended various other Matlab-based health care related simulations.

*Graduate Teaching Assistant*      *Dept. of Computer Science*      *01/2011-04/2011*  
*Supervisor: Dr. Steve Wolfman*      *University of British Columbia*

- Guided students and assessed performance in digital circuitry labs; coordinated and ran tutoring sessions for struggling students; graded assignments.

*Software Engineer (Intern)*      *Google Inc. (Maps, Earth)*      *05/2008-09/2008*  
*Supervisor: Carl Hamilton*

- Designed and implemented a visual tool for locality-based summarization and comparison of large geographic datasets.
- Server and data processing written in C++ using MapReduce, communicating asynchronously with a JavaScript client.

*Software Engineer (Intern)*      *Google Inc. (Maps, Earth)*      *06/2007-10/2007*  
*Supervisor: Jonathan Nowitz*

- Designed and implemented a domain specific language and monitoring utility, used for specifying and controlling large pipelines of parallel data processing jobs.

Graduate Teaching Assistant  
Supervisors:

Faculty of Computer Science  
Dalhousie University

2004-2006

Dr. Andrew Rau-Chaplin Dr. Philip Cox

- Ran tutorials; marked assignments and exams for CSCI 2100 (Data Structures/Algorithms in Java), CSCI 3110 (Analysis of Algorithms), and CSCI 4112/5112 (Theory of Computation)

## Technical Skills

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### *Software development (C, C++, Java, Python, Matlab)*

- Designed/wrote a 12,700 line C program evaluating various randomized search methods for a hard optimization problem in data warehousing.
- Designed/wrote a 13,000 line parallel Python program for distributed OLAP query processing.
- Lead developer of a 16,000 line C++ program implementing a detailed randomized simulation of patients on a wait list for kidney transplants, and evaluation of screening policies based on real-world data.

### *Relational Databases*

- Set up and maintained MySQL servers.
- Wrote software for connecting via JDBC.
- Extensive foundational experience (views, integrity constraints, schema management)
- Familiarity with data warehousing and OLAP operations.

### *Linux Development*

- Proficient with GNU Linux environment: gcc, make, gdb, bash tools such as grep, sed, awk etc.
- Familiarity with optimization and profiling tools such as valgrind, gprof.
- Set up and run extensive experimentation, made use of automation, measuring, processing and plotting of inputs/outputs.

### *Parallel programming*

- Designed, wrote and made extensions to C and C++ MPI programs.
- Designed/wrote parallel Python program for distributed execution of aggregate OLAP queries.
- Designed/wrote MapReduce code for parallel processing of large geographic data sets.

## Selected Publications

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### *Articles published in refereed conference proceedings*

- M. Lawrence, R. Pottinger, S. Staub-French, "Data Coordination: Supporting Contingent Updates", 37<sup>th</sup> International Conference on Very Large Databases (VLDB), 2011, pp. 831-842.
- M. Lawrence, R. Pottinger, S. Staub-French, "Coordination of Data in Heterogeneous Domains." 2<sup>nd</sup> International Workshop on New Trends in Information Integration (NTII), International Conference on Data Engineering (ICDE) pp. 167-170.
- X. Sun, R. Pottinger, M. Lawrence. "Support Elements in Graph Structured Schema Reintegration." International Conference on Information and Knowledge Management (CIKM).
- F. Dehne, M. Lawrence, A. Rau-Chaplin, "Cooperative Caching for Grid Based Data Warehouses", IEEE International Symposium on Cluster Computing and the Grid (CCGrid), 2007, pp. 31-38.
- M. Lawrence, F. Dehne, A. Rau-Chaplin, "Implementing OLAP Query Fragment Aggregation and Recombination for the OLAP Enabled Grid", IEEE International Parallel and Distributed Processing Symposium (IPDPS), 2007, pp. 1-8.
- M. Lawrence, A. Rau-Chaplin "Dynamic View Selection for OLAP", International Conference on Data Warehousing and Knowledge Discovery (DaWaK), 2006, pp. 33-44. (Chosen as top 10 paper).
- M. Lawrence, " Multiobjective Genetic Algorithms for Materialized View Selection in OLAP Data Warehouses", ACM Genetic and Evolutionary Computation Conference (GECCO), 2006, pp. 699-706.
- M. Lawrence, A. Rau-Chaplin, "The OLAP-Enabled Grid: Model and Query Processing Algorithms", International Symposium on High Performance Computing Systems and Applications (HPCS), 2006.
- M. Lawrence, T. Trappenberg, A. Fine, "A Multi-Modular Associator Network for Simple Temporal Sequence Learning and Recognition", European Symposium on Artificial Neural Networks (ESANN), 2005, pp. 423-428.

### *Articles published in refereed journals*

- J. Zhang, A. Webster, M. Lawrence, M. Nepal, R. Pottinger, S. Staub-French, M. Tory, "Improving the usability of standard schemas." International Journal of Information Systems, Vol 36, No 2, pp. 209-221, 2011.

- M. Lawrence, A. Rau-Chaplin, "Dynamic View Selection for OLAP", International Journal of Data Warehousing and Mining, Vol 4, No 1, pp. 47-61, January 2008.

*Invited Publication*

- M. Lawrence, T. Trappenberg, A. Fine, "Rapid Learning and Robust Recall of Long Sequences in Modular Associator Networks", Neurocomputing, Vol 69, No 7-9, pp. 634-641, March 2005.

**Invited Talks**

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- "Coordinating Updates Between Autonomous Databases." IBM Watson Research Center, New York. 2012
- "Data Coordination: Supporting Contingent Updates." SAP Research, Sophia-Antipolis, France. 2011

**Selected Honours and Awards**

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- Walter C. Sumner Memorial Scholarship (Canada wide) \$6,000. 2007,2010
- UBC Graduate Entrance Scholarship (Institution wide) \$10,000 2006-2007
- NSERC Postgraduate Scholarship, PhD Level (Canada wide) \$42,800 2006-2008
- Precarn Scholarship (Canada wide) \$7,500 2006
- NSERC Canada Graduate Scholarship, Master's Level (Canada wide) \$34,800 2004-2006
- Dalhousie In-Course Scholarship (Institution wide) 2002
- MT&T Ambassadors Program Scholarship (Institution wide) 2002
- Dalhousie Sexton list of distinguished students (Department wide) 2001-2004

**Professional Service**

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- External Reviewer, Proceedings of the Very Large Database Endowment (VLDB) 2008-2011
- External Reviewer, International Database Engineering and Applications Symposium (ICDE) 2006,2011
- Student Volunteer, SIGMOD Conference 2008
- Lab Assistant/Tutor, UBC TechTrek Computer Science Community Program 2007
- External Reviewer, International Conference on High Performance Computing 2006
- Webmaster, Bicycle Nova Scotia 2005-2007
- Webmaster, Dalhousie Chapter of the Golden Key International Honours Society 2003-2004
- Undergraduate Mathematics Competition Team Member Dalhousie University 2002-2004
- Second and Third Year Representative, Dalhousie Computer Science Society 2003-2003

**Extracurricular Activities**

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- Vancouver 12x12 Photo Marathon, Grand Winner, Theme Winner, Audience Picks Winner. 2009,2011
- Google Sports and Recreation "Strong Man" Champion 2008
- Member, "Fast Twitch" Track Cycling Team and BC Provincial Sprint Champion 2007-2008
- Member, Team Nova Scotia (Cycling), Canada Summer Games 2001