

Justin E. Gottschlich

Curriculum Vitae

Contact Information

Raytheon Company
16800 E. Centretech Parkway
Aurora, CO 80011

303-677-0793 (office)
justin@nodeka.com

Education

- 2008-Present Doctor of Philosophy in Electrical and Computer Engineering
University of Colorado – Boulder [Expected 2010]
Advisors – Professors Jeremy G. Siek & Manish Vachharajani
- 2004-2007 Master of Science in Electrical and Computer Engineering
University of Colorado – Boulder [GPA: 3.91 / 4.00]
Thesis – Exploration of Lock-Based Software Transactional Memory
Advisor – Professor Daniel A. Connors
- 1994-1998 Bachelor of Science in Computer Science
Colorado State University

Professional Experience

- 1998-Present Owner and Founder, Nodeka, LLC.
- 2009-Present Senior Software Engineer II *with Honors*, Raytheon Company
- 2007-2009 Senior Software Engineer II, Raytheon Company
- 2006-2007 Senior Software Engineer I *with Honors*, Raytheon Company
- 2004-2005 Senior Software Engineer I, Raytheon Company
- 2001-2004 Software Engineer II, Quark Inc.
- 2000-2001 Senior Software Engineer, KORE Inc.
- 1998-2000 Software Engineer I, Quark Inc.

Research Interests

Transactional Memory
Machine Learning
C/C++ Programming

Parallel and Concurrent Algorithms / Computing
Programming Languages and Interface Design
Computer Architecture

Honors / Awards

- 2009 Best Presentation Award, Raytheon Information Systems and Computing Symposium (ISaCTN), March 2009.
- 2009 Peer-Elected Technical Honors Recipient, Raytheon Company. Selected candidates were in the top 3.5% of peer elected engineers, company wide.
- 2006 Raytheon Employee of the Quarter (3rd Quarter 2006) for innovation and implementation of machine learning algorithms with regard to early hardware anomaly detection, prediction and avoidance, numerical computation sessions and transactional memory theory and software library construction.
- 2006 Peer-Elected Technical Honors Recipient, Raytheon Company. Selected candidates were in top 10% peer elected engineers, company wide.
- 2005 Peer-Elected Subject Matter Expert, Raytheon Company. Subject Matter Expert for all topics concerning C++ (standard C++, STL, templates, compilers, etc.).

Publications

Peer Reviewed Publications

- 2009 **An Efficient Lock-Aware Transactional Memory Implementation**
Justin E. Gottschlich, Jeremy G. Siek, Manish Vachharajani, Dwight Y. Winkler and Dan. A Connors
[To Appear: Proceedings of the 2009 ACM International Workshop on Implementation, Compilation, Optimization of Object-Oriented Languages, Programs and Systems (ICOOOLPS), July 2009]
- Toward Simplified Parallel Support in C++**
Justin E. Gottschlich, Jeremy G. Siek, Paul Rogers and Manish Vachharajani
[Proceedings of BoostCon '09, the Third International Boost Libraries Conference, May 2009]
- Shifting the Parallel Programming Paradigm (27% acceptance)**
(Winner Best Presentation Award)
Justin E. Gottschlich, Dwight Y. Winkler, Mark W. Holmes, Jeremy G. Siek and Manish Vachharajani
[Proceedings of the 2009 Raytheon Information Systems and Computing Symposium (ISaC), March 2009]
- Lock-Aware Transactional Memory**
Justin E. Gottschlich, Daniel A. Connors, Dwight Y. Winkler, Jeremy G. Siek and Manish Vachharajani
[Proceedings of the 2009 ACM SIGARCH-SIGPLAN-SIGOPS Architectural Support for Programming Languages and Operating Systems (ASPLOS) (poster), March 2009]
- 2008 **Optimizing Consistency Checking for Memory-Intensive Transactions**
Justin E. Gottschlich and Daniel A. Connors.
[Proceedings of the 2008 ACM SIGACT-SIGOPS Symposium on Principles of Distributed Computing (PODC) (brief announcement), August 2008]

C++ Move Semantics for Exception Safety and Optimization in Software Transactional Memory Libraries

Justin E. Gottschlich, Jeremy G. Siek and Daniel A. Connors.

[Proceedings of the 2008 International Workshop on Implementation, Compilation, Optimization of Object-Oriented Languages, Programs and Systems (ICOOOLPS), July 2008]

Extending Contention Managers for User-Defined Priority-Based Transactions

Justin E. Gottschlich and Daniel A. Connors.

[Proceedings of the 2008 ACM Workshop on Exploiting Parallelism with Transactional Memory and other Hardware Assisted Methods (EPHAM), April 2008]

2007 DracoSTM: A Practical C++ Approach to Software Transactional Memory

Justin E. Gottschlich and Daniel A. Connors.

[Proceedings of the 2007 ACM SIGPLAN Symposium on Library-Centric Software Design (LCSD), October 2007]

Technical Reports

2008 An Intentional Library Approach to Lock-Aware Transactional Memory

Justin E. Gottschlich, Daniel Connors, Dwight Winkler, Jeremy G. Siek and Manish Vachharajani.

[Technical Report #CU-CS-1048-08, October 2008]

A Consistency Checking Optimization Algorithm for Memory-Intensive Transactions

Justin E. Gottschlich, Daniel A. Connors and Jeremy G. Siek

[Technical Report #CU-CS-1049-08, October 2008]

Theses

2007 Exploration of Lock-Based Software Transactional Memory.

Justin E. Gottschlich.

[M.S. Thesis, University of Colorado at Boulder, October 2007]

Other Publications

2005 C++ Trees Part II: Basic core::tree Functionality.

Justin E. Gottschlich.

[GameDev.net, April 2005]

2005 C++ Trees Part I: Understanding the core::tree Implementation.

Justin E. Gottschlich.

[GameDev.net, January 2005]

Presentations

Peer-Reviewed Publication Presentations

- 2009 **Boost + Software Transactional Memory**
Justin E. Gottschlich, Jeremy G. Siek, Manish Vachharajani, Vicente Botet, Paul J. Rogers,
Maurice Herlihy
[Proceedings of BoostCon '09, the Third International Boost Libraries Conference, May 2009]
- Shifting the Parallel Programming Paradigm (27% acceptance)**
(Winner Best Presentation Award)
Justin E. Gottschlich, Dwight Y. Winkler, Mark W. Holmes, Jeremy G. Siek and Manish Vachharajani
[Proceedings of the 2009 Raytheon Information Systems and Computing Symposium
(ISaC), March 2009]
- Lock-Aware Transactional Memory**
Justin E. Gottschlich, Daniel A. Connors, Dwight Y. Winkler, Jeremy G. Siek and Manish Vachharajani
[Proceedings of the 2009 ACM SIGARCH-SIGPLAN-SIGOPS Architectural Support for Programming
Languages and Operating Systems (ASPLOS) (poster), March 2009]
- 2008 **Optimizing Consistency Checking for Memory-Intensive Transactions**
Justin E. Gottschlich and Daniel A. Connors
[Proceedings of the 2008 ACM SIGACT-SIGOPS Symposium on Principles of Distributed Computing
(PODC) (brief announcement), August 2008]
- Extending Contention Managers for User-Defined Priority-Based Transactions**
Justin E. Gottschlich and Daniel A. Connors
[Proceedings of the 2008 ACM Workshop on Exploiting Parallelism with Transactional Memory and
other Hardware Assisted Methods (EPHAM) April 2008]
- 2007 **DracoSTM: A Practical C++ Approach to Software Transactional Memory**
Justin E. Gottschlich and Daniel A. Connors
[Proceedings of the 2007 ACM SIGPLAN Symposium on Library-Centric Software Design (LCSD),
October 2007]

Other Presentations

- 2007 **Characterizing Optimization Potential in Lock-Based Software Transactional Memory**
Justin E. Gottschlich and Daniel A. Connors.
[Proceedings of the Front Range Architecture Compilers Tools and Languages Workshop (FRACTAL)
October 2007]

Teaching

- 2009 **Graduate Teaching Assistant: Neural Network Design**
Justin E. Gottschlich
[ECEN 5028, University of Colorado-Boulder, Summer 2009]

2008 Graduate Teaching Assistant: Neural Network Design
Justin E. Gottschlich
[ECEN 5028, University of Colorado-Boulder, Fall 2008]

Teaching Presentations

2008 Invited Guest Lecturer: Transactional Memory Fundamentals
Justin E. Gottschlich
[ECEN 5553, University of Colorado-Boulder (3 lectures), April, 2008]

2007 Fundamentals of Parallel Programming
Justin E. Gottschlich
[Raytheon Company, Aurora, Colorado (4 lectures)]

2006 Basic Principles of Numerical Computation
Justin E. Gottschlich
[Raytheon Company, Aurora, Colorado (4 lectures)]

2006 Dynamic and Static Libraries: Tools And Their Place In Technology
Justin E. Gottschlich
[Raytheon Company, Aurora, Colorado]

2005 Windows Exception Handling Component: Crash-Based Stack Walker
Justin E. Gottschlich
[Raytheon Company, Aurora, Colorado]

2005 Service Oriented Architecture: A Guide Into Future Software
Mark W. Holmes, Paul J. Rogers, Justin E. Gottschlich
[Raytheon Company, Aurora, Colorado]

2004 Advanced C++: Template Based Policy Programming
Justin E. Gottschlich
[Quark, Inc., Denver, Colorado]

2003 Basic C++: Top Ten Misunderstood Concepts in C++
Justin E. Gottschlich
[Quark, Inc., Chandigarh, India / Denver, Colorado]

2000 C++ and Object Oriented Programming
Justin E. Gottschlich
[Quark, Inc., Denver, Colorado]

1998 Introduction to C++
Justin E. Gottschlich
[Introduction to Programming, Colorado State University, Fort Collins, Colorado]

Professional Service

- 2009 BoostCon'10, Program Committee Member.
- 2008 Served as anonymous reviewer for the International Symposium on Code Generation and Optimization (CGO), 2008.
- 2008 Served as anonymous reviewer for the Journal of Parallel and Distributed Computing (JPDC), Elsevier Publishing, 2008.
- 2008 Served as anonymous reviewer for International Symposium on Computer Architecture (ISCA), 2007-2008.
- 2007 Served as anonymous reviewer for Science of Computer Programming, Elsevier Publishing, 2007.
- 2006 Served as Expert Witness for C++ and Game Development in Fitzsimmons vs. Mallory at Boulder Courthouse, April 4th, 2006.

Graduate Coursework

- 2007 ECEN6950 – Thesis: *Exploration of Lock-based Software Transactional Memory*
ECEN5120 – Neural Network Design
CSCI5454 – Design and Analysis of Algorithms
- 2006 CSCI5606 – Principles of Numerical Computation
ECEN5553 – Parallel Processing
ECEN6950 – Thesis Research: Compiler Analysis / Transactional Memory (advisor: Dr. Connors)
- 2005 ECEN5583 – Artificial Intelligence
ECEN5840 – Compiler Construction: x86 Assembly Regions
ECEN5593 – Advanced Computer Architecture
- 2004 ECEN5013 – Code Generation and Optimization

Notable Software Development

- 1998 – 2006 Owner and founder of Nodeka, LLC., an online multiplayer company. Sole developer of Nodeka's 300,000+ lines of C++ source (www.nodeka.com).
- 2006 Designed / Implemented *DracoSTM* (Software Transactional Memory) C++ library. Library currently supports transaction composition and requires few programmatic casts, improving on type-safety. LCSD 2007 describes high-level behavior.
- 2006 Designed / Implemented Machine Learning Adaptive Database Solution.
- 2006 Designed / Implemented Test Framework in C++ for automated unit testing at Raytheon Company. A number of "simplicity" features are built into the framework such as; highly decoupled automated testing suite, unconstrained tests within single test class, simple categorization for passed, failed and not run depending on exception behavior, no required .cc/.cpp file construction for tests allowing rapid test development.
- 2006 Designed / Implemented Learning Bayesian Reasoner for learning a graphical model to aid in forecasting events using partial and complete data. Project is being worked on for Raytheon Company.
- 2006 Designed and assessed feasibility of *Dynamic Library Framework for Run-Time Image Loading/Unloading* for Raytheon Company.
- 2005 Designed / Implemented *Artificial Intelligence Bayesian Reasoner* for research project for Raytheon Company.
- 2005 Designed / Implemented *Windows Crash Stack Trace Component* used as a baseline framework for numerous Windows based components for Raytheon Company.
- 2004 Designed / Implemented *Rules / Expressions Framework* for QuarkXPress 7.0. Similar in behavior to Outlook Rules.
- 2003 Designed / Implemented *Exception Handling Architecture* of QuarkXPress 7.0.
- 2002 Designed / Implemented *C++ Template Memory Manager* used as base memory management system for all QuarkXPress boxes in QuarkXPress 6.0.
- 2001 Designed / Implemented *C++ Multi-Threaded XML-Driven Macromedia Communication Framework* for KORE, Inc. Interface via Macromedia Director.
- 2001 Designed / Implemented *Near Real-Time Web-Enabled Multiplexer Image Relay System* for KORE, Inc.
- 2000 Designed / Implemented *C++ Template containers; core::tree, core::multitree, core::tree_pair and core::multitree_pair* for Nodeka, LLC. Containers were first

licensed by Quark, Inc. and are now used by over a dozen academic institutions (Brown University) and commercial business (Motorola, Poland). Quark recently requested extension of their license agreement to allow usage of tree container throughout all of QuarkXPress's source code (2004). All licenses have been free of charge and are now under LGPL, Lesser GNU Public License.