

Qing Yi

Computer Science Department,
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- EDUCATION
- ◇ **Rice University**, Houston, TX
Ph.D. in Computer Science, May 2002; Advisor: Ken Kennedy
M.S. in Computer Science, Dec 1999.
 - ◇ **Institute of Computing Technology, Chinese Academia Sinica**, P.R.China.
M.S. in Computer Science, June, 1995
 - ◇ **Shandong University**, P.R.China
B.S. in Computer Science, June, 1992
- RESEARCH INTERESTS
- Compiler construction and optimization, program analysis, programming languages, parallel and distributed systems, software engineering.
- RESEARCH EXPERIENCE
- ◇ **Assistant Professor**, Computer Science Department, University of Texas at San Antonio (Aug 2005 – present)
 - ◇ **Post-doctorate associate**, Lawrence Livermore National Laboratory, Livermore CA (Jan 2003 – Aug 2005)
Work on ROSE, a C++ source-to-source compiler infrastructure that optimizes scientific applications through the recognition of user-defined abstractions.
 - Develop techniques to apply traditional compiler analysis (including control-flow, data-flow and array dependence analysis) and transformations (including loop and data layout transformations) to user-defined library abstractions in C++.
 - Analyze the performance of scientific applications and develop techniques to automate the empirical tuning of compiler optimizations.
 - Develop techniques to automate the parallelization of C++ applications using OpenMP directives.
 - ◇ **Post-doctorate associate**, Computer Science department, Rice University, Houston, TX (June 2002 - Dec. 2002)
Research in the area of automatic tuning of loop optimizations in achieving high performance for scientific applications.
 - ◇ **Ph.D candidate**, Computer Science department, Rice University, Houston, TX (Sep 1996 - May 2002)
Dissertation: Transforming Complex Loop Nests for Locality
 - Invented dependence hoisting, a novel loop transformation technique that directly achieves the fusion and interchange of arbitrarily nested loops. The transformation is both inexpensive and highly effective.
 - Successfully applied dependence hoisting to block several linear algebra kernels in LINPACK and in several cases achieved superior performance than that previously achieved by professional algorithm designers.
 - Developed an automatic recursion transformation, the first compiler work which automatically transforms loop structures into recursive forms to exploit locality simultaneously at multiple levels of the memory hierarchy.

- ◇ **M.S candidate**, Institute of Computing Technology, Chinese Academia Sinica
(Sep 1992 - May 1995)
Dissertation titled *Chinese character encoding and automatic recognition*. Developed a new Chinese-handwriting automatic online-recognition system.
- TEACHING EXPERIENCE Assistant professor, Computer Science Department, University of Texas at San Antonio (2005-present)
Taught the following courses.
cs5363: programming languages and compilers (Fall 2006).
cs3723: programming languages (Fall 2005; Fall 2006; Spring/Fall 2007).
cs4713: compiler writing (Spring 2006, Fall 2007).
Teaching Assistant, Computer Science, Rice University, Houston, TX (1998-2001)
Helped teaching introductory programming, introductory discrete mathematics, algorithm design and analysis, automata and formal languages, and advanced compiler optimizations. Work included grading assignments, grading exams, and answering questions from students. Helped lecturing the advanced compiler class when the professor was away.
- INDUSTRIAL EXPERIENCE Software engineer, Beijing Zhenzhong Electronic Inc., P.R.China (June 1995 - July 1996)
Programming in C, independently developed the following software products
 - A BASIC compiler that produces object code for a handheld computer
 - A BASIC application debugging tool that simulates the handheld computer
 - An automatic telephone query/notification management system
- JOURNAL PUBLICATION ◇ **Transforming Complex Loop Nests For Locality**
Qing Yi, Ken Kennedy, and Vikram Adve
The Journal Of Supercomputing, Vol 27, pages 219-264, 2004
- ◇ **Improving Memory Hierarchy Performance Through Combined Loop Interchange and Multi-level Fusion** Qing Yi and Ken Kennedy
International Journal of High Performance Computing Applications, Vol 18, No.2, 2004
- ◇ **Advanced Optimization Strategies in the Rice dHPF compiler**
John Mellor-Crummey, Vikram Adve, Bradley Broom, Daniel Chavarria-Miranda, Robert Fowler, Guohua Jin, Ken Kennedy and Qing Yi
Concurrency and Computation: Practice and Experience, 14(8-9):741-767, 2002
- CONFERENCE PUBLICATION ◇ **Automated Transformation for Performance-Critical Kernels**
Qing Yi and Clint Whaley
ACM SIGPLAN Symposium on Library-Centric Software Design, Montreal, Canada. Oct, 2007
- ◇ **POET: Parameterized Optimizations for Empirical Tuning**
Qing Yi, Keith Seymour, Haihang You, Richard Vuduc and Dan Quinlan
Workshop on Performance Optimization for High-Level Languages and Libraries, Mar 2007.
- ◇ **Annotating user-defined abstractions for optimization**
Dan Quinlan, Markus Schordan, Richard Vuduc, and Qing Yi
Workshop on Performance Optimization for High-Level Languages and Libraries, Rhodes Island, Greece. April 2006.
- ◇ **Applying Data Copy to Improve Memory Performance of General Array Computations**
Qing Yi
The 18th International Workshop on Languages and Compilers for Parallel Computing, Hawthorne, New York. Oct 2005.

- ◇ **Toward the Automated Generation of Components from Existing Source Code**
Dan Quinlan, Qing Yi, Gary Kurfert, Thomas Epperly, Tamara Dahlgren, Markus Schordan, and Brian White
The Second Workshop on Productivity and Performance in High-end Computing, San Francisco, Feb, 2005.
- ◇ **Classification and Utilization of Abstractions for Optimization**
Dan Quinlan, Markus Schordan, Qing Yi, and Andreas Saebjornsen
The First International Symposium on Leveraging Applications of Formal Methods, Paphos, Cyprus, Oct, 2004.
- ◇ **Applying Loop Optimizations to Object-oriented Abstractions Through General Classification of Array Semantics**
Qing Yi and Dan Quinlan
The 17th International Workshop on Languages and Compilers for Parallel Computing, West Lafayette, Indiana, USA. Sep. 2004.
- ◇ **Automatic Blocking Of QR and LU Factorizations for Locality**
Qing Yi, Ken Kennedy, Haihang You, Keith Seymour, and Jack Dongarra
The Second ACM SIGPLAN Workshop on Memory System Performance, Washington, DC, USA. June. 2004.
- ◇ **Semantic-Driven Parallelization of Loops Operating on User-Defined Containers**
Dan Quinlan, Markus Schordan, Qing Yi and Bronis de Supinski
The 16th Annual Workshop on Languages and Compilers for Parallel Computing, College Station, TX, USA. Oct. 2003.
- ◇ **A C++ infrastructure for Automatic Introduction and Translation of OpenMP Directives** Dan Quinlan, Markus Schordan and Qing Yi
Workshop on OpenMP Applications and Tools, Toronto, Ontario, Canada. June. 2003
- ◇ **Improving Memory Hierarchy Performance Through Combined Loop Interchange and Multi-level Fusion**
Qing Yi and Ken Kennedy
LACSI Symposium, Santa Fe, NM. Oct. 2002.
- ◇ **Transforming Loops To Recursion For Multi-Level Memory Hierarchies**
Qing Yi, Vikram Adve, and Ken Kennedy
ACM SIGPLAN conference of Programming Language Design and Implementation, Vancouver, British Columbia, Canada. June. 2000
- ◇ **High Performance Fortran Compilation Techniques for Parallelizing Scientific Codes** Vikram Adve, Guohua Jin, John Mellor-Crummey, and Qing Yi
Supercomputing. Orlando, FL, USA. Nov. 1998