Mirza O Beg

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Current Research Interests

Include the following but are not limited to:

1. Energy optimization
2. Constraint optimization
3. Compiler optimization
4. Optimizations for the memory hierarchy

Education

June 2012 (expected) — **Doctor of Philosophy in Computer Science**
University of Waterloo, Waterloo, Ontario
Advisors: Peter van Beek and Ondrej Lhotak
Thesis: Compiler Optimizations for Embedded Processors

August 2007 — **Masters of Mathematics in Computer Science**
University of Waterloo, Waterloo, Ontario
Advisors: Martin Karsten and Srinivasan Keshav
Thesis: FLECS: A Data-Driven Framework for Rapid Protocol Prototyping

August 2001 — **Bachelor of Science in Computer Sciences** - High Honors
University of Texas, Austin
Advisor: Michael Dahlin
Thesis: Memory Management in the Active Names System

Advanced Courses

Internet-Scale Distributed Data Management
Mathematical Foundations of Computer Networking
Graph Theoretic Algorithms
Constraint Programming
Systems Performance Analysis
Computer Networks
Automata Theory
Operating Systems
Algorithm Design and Analysis
Advanced Compiler Design
Multi-Agent Systems
Cryptography/ Network Security
Software Architecture
Programming Languages
Neural Networks
Technical Writing
Distributed Systems
Software Component Technologies

Research Experience

September 2007 - Present
Research Assistants/Teaching Assistant
University of Waterloo
Worked on a number of compiler optimization problems targeted towards low-end, power constrained processors. These include instruction scheduling for clustered architectures, cache optimizations and code generation. This work combines compiler optimization and design with graph theoretic techniques and constraint optimization.

September 2005 - August 2007
Research Assistant/Teaching Assistant
University of Waterloo
Studied packet processing techniques and network protocols for current and future communication networks. Developed a universal forwarding engine based on axiomatic formulation of fundamental mechanisms in communication networks. Extended the formal analysis of communication networks described in, *An Axiomatic basis for Communication (SIGCOMM 2007)* by developing a protocol prototyping tool called FLECS

August 2000 - August 2001
Research Assistant
University of Texas, Austin
Worked on Resource Management issues in Distributed Systems under the supervision of Dr. Michael Dahlin. Designed and implemented a memory management system for Java to enhance the security structure of the Java Runtime Environment. The system is developed using bytecode rewriting techniques using the Jikes bytecode toolkit

Professional Experience

October 2003 - October 2004
Software Engineer
Streaming Networks Inc.
Worked with the development of embedded systems and embedded applications. Key responsibilities included development and integration of device drivers for the Phillips Trimedia processor for the Nref PNX1500 board. Specifically I worked with the development of the LAN100 driver and UDP stack implementation to provide network access to the multimedia applications. I have also worked on the development of network applications for the Nref based standalone system

September 2001 - May 2003
Software Engineer
SABRE Airline Solutions
Worked with the development of software solutions for the Airline industry. Contributed to several groups as a developer including Airport Resource Management, Yield Management and Product Integration using C++ and Java technologies. I was involved in designing and implementing software solutions for the travel marketing business as well as developing solutions in host connectivity, server side processes as well as user interface creation for worldwide carriers including American Airlines, Malaysian Airlines, TACA and Cathay Pacific

Technical Skills

Languages	Java, C, C++, Scheme, ML, Shell scripting,
OS	Unix, Windows, Cent OS
Software	ILOG Solver, ILOG ILP, ILOG Rules Engine

Refereed Publications

Mirza Beg, Peter van Beek "A Constraint Programming Approach for Integrated Spatial and Temporal Scheduling for Clustered Architectures". In *ACM Transactions on Embedded Computing Systems (ACM TECS).(In Revision)*, 2012

Mirza Beg, Peter van Beek "A Constraint Programming Approach for Instruction Assignment". In *Proceedings of the 15th Workshop on Interaction between Compilers and Computer Architectures (INTERACT-15)*, pages 25-34, San Antonio, Texas, February 2011

Mirza Beg, Peter van Beek "A Graph Theoretic Approach to Cache-Conscious Data Placement for Direct mapped Caches". In *Proceedings of the 9th International Symposium on Memory Management 2010 (ISMM '10)*, pages 113-120, Toronto, Canada, June 2010

Mirza Beg "Instruction Scheduling on Multicores". *PLDI '10 Student Research Competition*, Poster Presentation Toronto, Canada. June 2010. Winner of third place in graduate student track of ACM SRC PLDI 2010

Mirza Beg "FLECS: A Framework for Rapidly Implementing Forwarding Protocols". In *Proceedings of the First International Conference on Complex Sciences (COMPLEX 2009)*, pages 1761-1773, Shanghai, China, February 2009

Martin Karsten, S.Keshav, Sanjiva Prasad, Mirza Beg "An Axiomatic Basis for Communication". In *Proceedings of the 2007 Conference on Applications, Technologies, Architectures and Protocols for Computer Communications (SIGCOMM '07)*, pages 217-228, Kyoto, Japan, August 2007

Aaditeshwar Seth, Mirza Beg "Achieving Privacy and Security in Radio Frequency Identification". In *Proceedings of Fourth Annual Privacy Security Trust 2006 (PST '06)*, pages 362-365, Markham, Ontario, Canada, October 2006

Non-Refereed Publications

Mirza Beg "Critical Path Heuristic for Automatic Parallelization". *University of Waterloo, David R. Cheriton School of Computer Science. Technical Report CS-2008-16.* August 2008

Mirza Beg, Laurent Charlin, Joel So "MAXSM: A Multi-Heuristic Approach to XML Schema Matching". *University of Waterloo, David R. Cheriton School of Computer Science. Technical Report CS-2006-47.* December 2006

Mirza Beg, Mike Dahlin "A Memory Accounting Interface for Java Programming Language". *The University of Texas at Austin, Department of Computer Sciences. Technical Report CS-TR-01-40.* October 2001

Teaching

Fall 2005	TA CS125	Conducted the lab and assisted students on their assignments (Java)
Spring 2006 - Spring 2010	IA CS245	Conducted tutorials, managed TA's multiple terms
Winter 2006	TA CS343	Marked assignments and exams (C++, μC++)
Fall 2008	IA CS145	Managed TA's (Scheme, C)
Winter 2010	IA CS136	Conducted tutorials and assisted students (Scheme, C)
Spring 2009	TA CS486	Marked assignments, created test scripts, consulted students
Fall 2006	TA CS456	Marked assignments, created test scripts, consulted students and managed labs
Spring 2008	TA CS456	Marked assignments, managed the network lab
Winter 2011	TA CS442	Consulted students, managed grades, marked assignments/exams
Spring 2011	TA CS116	Marked assignments/exams (Scheme, Python)

Honors and Awards

2010	Third place at the ACM Student Research Competition at PLDI
2010	ACM SIGPLAN Professional activities grant
2010	University of Waterloo Graduate Scholarship
2007-2008	University of Waterloo Doctoral Student Scholarship
2005-2008	University of Waterloo Graduate Scholarship
2005-2007	University of Waterloo International Masters Student Award
2001	Special Honors in Computer Science, University of Texas at Austin
2000	Novell Scholarship for Active Research
1999	The Tivoli Scholarship for Academic Excellence
1998-2000	University Honors, University of Texas at Austin

Activities

Student Member of the ACM (Since 2009)
Volunteer at the March Break Open House at the University of Waterloo 2007
Volunteer at the CS4U day at the University of Waterloo 2008
Volunteer at the Grad Visit Day 2010
Volunteer for Fall Open House at the University of Waterloo 2011

References

Dr. Peter van Beek, Professor, University of Waterloo (vanbeek @ uwaterloo.ca)
Dr. Ondrej Lhotak, Associate Professor, University of Waterloo (olhotak @ uwaterloo.ca)
Dr. Peter Buhr, Associate Professor, University of Waterloo (pabuhr @ uwaterloo.ca)
Barbara Daly, Instructional Support Coordinator, University of Waterloo (bmzister @ uwaterloo.ca)