

Katherine E. Coons

Curriculum Vitae

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Research Interests

I am interested in the compiler's interactions with other levels in the computational stack, such as supporting the right abstractions at the programming language level, and finding the most efficient ways to express and execute those programs at the ISA and microarchitecture levels.

Education

- 8/2005–present **University of Texas, Austin, TX**
Ph.D. student in the Department of Computer Sciences
Advisor: Kathryn S. McKinley
Expected graduation: 5/2011
- 8/2005-5/2008 **University of Texas, Austin, TX**
Master of Science in Computer Science
- 8/2001–5/2005 **University of Virginia, Charlottesville, VA**
B.S. with High Distinction in Computer Science
Completed requirements for B.S. in Computer Engineering
Minor in Engineering Business

Honors

- 9/2007 Bruton Fellowship
- 1/2006 National Science Foundation Graduate Research Fellowship recipient
- 8/2005 Microelectronics and Computer Development (MCD) Fellowship
- 8/2005 Dean's Excellence Award, College of Natural Sciences, UT Austin
- 5/2005 Department of Computer Science Undergraduate Award for Education
- 1/2005 CRA Outstanding Undergraduate Award, Honorable Mention
- 5/2003 Intermediate Honors
- 8/2001 Charles L. Brown Scholarship award winner
- 8/2001 Rodman Scholar

Publications

Mark Gebhart, Bertrand A. Maher, Katherine E. Coons, Jeff Diamond, Paul V. Gratz, Mario Marino, Nitya Ranganathan, Behnam Robatmili, Aaron Smith, James Burrill, Stephen W. Keckler, Doug Burger, Kathryn S. McKinley. An Evaluation of the TRIPS Computer System. In the 14th International Conference on Architectural Support for Programming Languages and Operating Systems (ASPLOS '09). March, 2009 (To appear).

Behnam Robatmili, Katherine E. Coons, Doug Burger, Kathryn S. McKinley. Strategies for Mapping Dataflow Blocks to Distributed Hardware. In the 41st Annual IEEE/ACM International Symposium on Microarchitecture (MICRO '08). November, 2008. **Best Student Presentation Award.**

- Katherine E. Coons, Behnam Robatmili, Matthew E. Taylor, Bertrand A. Maher, Doug Burger, Kathryn S. McKinley. Feature Selection and Policy Optimization for Distributed Instruction Placement Using Reinforcement Learning. In the 17th International Conference on Parallel Architectures and Compilation Techniques (PACT '08). October, 2008.
- Behnam Robatmili, Katherine E. Coons, Doug Burger, Kathryn S. McKinley. Register Bank Assignment for Spatially Partitioned Processors. In the 21st Annual Workshop on Languages and Compilers for Parallel Computing (LCPC '08). July, 2008.
- Behnam Robatmili, Katherine E. Coons, Doug Burger. Balancing Local and Global Parallelism for Single-Thread Applications in a Composable Multi-Core System. In the 2008 Workshop on Parallel Execution of Sequential Programs on Multi-core Architectures. June, 2008.
- Matthew E. Taylor, Katherine E. Coons, Behnam Robatmili, Doug Burger, and Kathryn S. McKinley. Policy Search Optimization for Spatial Path Planning. In the NIPS-07 Workshop on Machine Learning for Systems Problems. December, 2007. (Two page extended abstract)
- Bill Yoder, Jim Burrill, Robert McDonald, Kevin Bush, Katherine E. Coons, Mark Gebhart, Sibi Govindan, Bertrand Maher, Ramdas Nagarajan, Behnam Robatmili, Karu Sankaralingam, Sadia Sharif, Aaron Smith, Doug Burger, Stephen W. Keckler, and Kathryn S. McKinley. In the 3rd Annual Workshop on Modeling, Benchmarking and Simulation. June, 2007.
- Katherine E. Coons, Xia Chen, Sundeep K. Kushwaha, Doug Burger, Kathryn S. McKinley. A Spatial Path Scheduling Algorithm for EDGE Architectures. In the 12th International Conference on Architectural Support for Programming Languages and Operating Systems (ASPLOS '06). October, 2006.

Research Experience

- 7/2005–present **Graduate Research Assistant**
Advisor: Kathryn S. McKinley, co-advised by Doug Burger
Implemented and evaluated an instruction placement algorithm for an explicit dataflow graph execution (EDGE) ISA, collaborated with a student in reinforcement learning to improve instruction placement heuristics, helped evaluate different strategies for mapping blocks of instructions to a distributed substrate, and helped develop block formation policies for an EDGE ISA.
- 5/2008-8/2008 **Intern, Microsoft Research**
Manager: Shaz Qadeer and Madan Musuvathi
Improved a model-checking tool for concurrent software named CHES by implementing a best first search and creating several priority functions that favor executions more likely to cause bugs. Developed a space-efficient, parallelizable representation for the search space to reduce the overheads of a best-first search.
- 9/2007-12/2007 **Intern, Microsoft Research**
Manager: Jim Larus
Implemented a sound and complete dynamic data race detector in a software transactional memory system to alleviate the need for strong atomicity in cases where a data race exists.
- 12/2004–6/2005 **Undergraduate Senior Thesis**
Advisor: Jack W. Davidson
Thesis title: Profile-guided Compiler Optimization: Loop Unrolling with Loop Trip-count Histogram Profiling.

- 6/2004-8/2004 **Computing Research Association Distributed Mentor Program**
Mentor: Kathryn S. McKinley
Created a PowerPC backend for the Scale compiler. Participated in the TRIPS and Speedway compiler research groups.

Work Experience

- 6/2001-12/2005 **Software Developer**, Naval Surface Warfare Center, Carderock Division
Designed, implemented, tested, and documented new features for ASSET, a surface ship design tool, as part of the Computer Modeling and Simulation Division.
- 6/2000-8/2000 **Science and Engineering Apprenticeship Program**
Developed cost and economic analysis software for the Naval Surface Warfare Center culminating in a technical report and oral presentation.
- 6/1999-9/1999 **Web developer**, World Business Club Corporation
Implemented new web features using ASP with a Microsoft SQL Server database.

Teaching Experience

- 1/2005-5/2005 **Lead Teaching Assistant**
University of Virginia Department of Computer Science
Led lab sections of 15-25 students in a sophomore data structures course. Oversaw three undergraduate teaching assistants. Position normally reserved for graduate students.
- 1/2003-5/2005 **Undergraduate Teaching Assistant**
University of Virginia Department of Computer Science
Helped oversee lab sections, held office hours, helped improve lab sections and developed course materials for a sophomore level data structures course.
- 1/2004-5/2005 **Tutor**
Association for Computing Machinery, University of Virginia
Tutored students one-on-one in introductory computer science.

Service and Professional Activities

Diversity Activities

- Attendee and Invited Speaker, Google Workshop for Women Engineers. January, 2009.
- Organizer, UT Computer Science Roadshow. August, 2008 - present.
- Advisory Board Member, UT Graduate Women in Computing. August, 2008 - present.
- Participant, SOSP Women's Workshop. October, 2007.
- Member, UTCS Women's Advisory Council. Spring, 2007.
- Participant, CRA-W & CDC Programming Languages Summer School. May, 2007.
- Participant, CRA-W Graduate Cohort Workshop. March, 2007.
- Co-Organizer, UT Computer Science Roadshow. Spring, 2007.
- Department liaison, Grace Hopper Celebration of Women in Computing. October, 2006.
- Participant, CRA-W & CDC Computer Architecture Summer School. July, 2006.
- Department liaison, Richard Tapia Celebration of Diversity in Computing. October, 2005.
- Volunteer, First Bytes Outreach Program for Women. July, 2004.

Other Activities

Scribe, UW/MSR Summer Institute 2008, The Concurrency Challenge: Can We Make Parallel Programming Popular? August, 2008.

Reviewer, The 17th International Conference on Parallel Architectures and Compilation Techniques.

Participant, The 3rd International Summer School on Advanced Computer Architecture and Compilation for Embedded Systems. July, 2007.

Reviewer, IEEE International Symposium on Workload Characterization (IISWC 2006).

Personal Details

Date of birth: December 19th, 1982

Place of birth: Alexandria, VA

Citizenship: United States

References

Kathryn S. McKinley

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