Rebecca L. Collins

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EDUCATION

Columbia University

- Ph.D. student, Computer Science Sep. '05 – present
  GPA 4.0/4.0
  HONORS: IBM Fellowship, 2009; NDSEG Fellowship 2005-2008

University of Tennessee - Knoxville

- M.S., Computer Science Dec. '04
  GPA 4.0/4.0, Thesis: *A Framework for Downloading Wide-Area Files*
- B.S., Computer Science, Minor Mathematics May '03
  GPA 3.95/4.0, Summa Cum Laude

RESEARCH EXPERIENCE

System-Level Design Group, Research Assistant, Columbia University Sep. '05 – present

- Built tool to automatically generate parallel code for recursive programs on distributed memory architecture
- Designed and empirically tested a back-pressure based load balancing technique for stream programs
- Examined how topology influences throughput performance in latency-insensitive systems
- Formally verified two implementations of the latency-insensitive design library

Google, Intern, Jul. '09 – Oct. '09

- Creating visualization tool for events in distributed storage system using the Google Web Toolkit
- Evaluated algorithms for management of a distributed system: how the frequency of status updates from system components impacts overall system throughput and latency

IBM T.J.Watson Research Center, Intern, Apr. – Jul. '09, Apr. – Aug. '07

- Profiled performance of Intel Nehalem memory hierarchy
- Conducted study of the trade-offs of high-level programming tools on streaming multi-core systems
- Evaluated the Cell BE processor vs. the NVIDIA GeForce 8800 GPU for general purpose programs
- Implemented parallel benchmarks Bitonic Sort, Binomial Options Pricing, and Smith-Waterman alignment with the RapidMind programming tool

Network Computing Lab, Research Assistant, Columbia University Sep. '05 – Aug. '06

- Augmented a Linux sound device driver to enable audio capture in the THINC thin-client system
- Evaluated VoIP performance of the thin client on a PDA

Logistical Computing and Internetworking Lab, Research Assistant, University of Tennessee, Jan. '04 – Jul. '07,

- Participated in a study of small optimal parity-check erasure codes Aug. '02 – May '03
- Empirically analyzed algorithms for downloading distributed wide-area files
- Built a content-addressable server that uses MD5 hashes as an extension to the Internet Backplane Protocol

SELECTED PUBLICATIONS

- R. L. Collins, B. Vellore and L. P. Carloni, "Recursion-Driven Parallel Code Generation for Multi-Core Platforms", *Design, Automation and Test in Europe (DATE)*, Mar. 2010.
- R. L. Collins and L. P. Carloni, "Flexible Filters: Load Balancing through Backpressure for Stream Programs", *International Conference on Embedded Software (EMSOFT)*, Oct. 2009.
- R. L. Collins and L. P. Carloni, "Topology-Based Performance Analysis and Optimization of Latency-Insensitive Systems", *IEEE Transactions on Computer-Aided Design of Integrated Circuits and Systems*, Volume 27, Number 12, Dec. 2008.
- R. L. Collins and L. P. Carloni, "Topology-Based Optimization of Maximal Sustainable Throughput in a Latency-Insensitive System", *Design Automation Conference (DAC)*, Jun. 2007.
- R. L. Collins and J. S. Plank, "Assessing the Performance of Erasure Codes in the Wide-Area," *The International Conference on Dependable Systems and Networks (DSN)*, Jun. 2005.