Rebecca L. Collins

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EDUCATION

Columbia University

- Ph.D. candidate, Computer Science Sep. '05 – present
  GPA 4.0/4.0

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

HONORS

- IBM Fellowship, 2009
- NDSEG Fellowship, 2005 Recipient, 3 year Graduate Fellowship, 2005-2008
- Computer Science Service Award, Columbia University, 2006, 2007, 2009
- Citation for Outstanding Academic Achievement, University of Tennessee, 2003
- Honors Scholar, University of Tennessee, 1999-2003
- Kimberly-Clark Scholarship, 2002 (first scholarship given by UT's CS Dept.)
- National Merit Scholarship, Presidential Scholarship, University of Tennessee, 2000-2003

RESEARCH EXPERIENCE

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

- Built tool to generate parallel code for recursive programs on distributed memory architecture
- Designed and 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 trade-offs of high-level programming tools on streaming multi-core platforms
- Evaluated the Cell BE 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, Aug. ’02 – May ‘03

- Participated in a study of small optimal parity-check erasure codes
- 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

PUBLICATIONS

Refereed Journal Papers

- 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.

Refereed Conference Papers

- 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.
- U. Cummings, D. Daly, R. Collins, V. Agarwal, F. Petrini, M. Perrone, and D. Pasetto, "Fulcrum's FocalPoint FM4000: A Scalable, Low-latency 10 GigE Switch for High-performance Data Centers", *Symposium for High Performance Interconnects (HotInterconnects)*, Aug. 2009.
- 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.
- C. Li, R. Collins, S. Sonalkar, L.P. Carloni, "Design, Implementation, and Validation of a New Class of Interface Circuits for Latency-Insensitive Design", *International Conference on Formal Methods and Models for Codesign (MEMOCODE)*, May 2007.
- R. L. Collins and J. S. Plank, “Assessing the Performance of Erasure Codes in the Wide-Area,” *International Conference on Dependable Systems and Networks (DSN)*, Jun. 2005.
- J. S. Plank, A. L. Buchsbaum, R. L. Collins and M. G. Thomason, ``Small Parity-Check Erasure Codes - Exploration and Observations," *International Conference on Dependable Systems and Networks (DSN)*, Jun. 2005.
- R.L. Collins and J.S. Plank, ``Downloading Replicated, Wide-Area Files -- a Framework and Empirical Evaluation," *International Symposium on Network Computing and Applications (NCA)*, Aug. 2004.
- N.E. Baldwin, R.L. Collins, M.A. Langston, M.R. Leuze, C.T. Symons and B.H. Voy, ``High Performance Computational Tools for Motif Discovery," *IEEE International Workshop on High Performance Computational Biology (HiCOMB)*, Apr. 2004.
- R.L. Collins and J.S. Plank, ``Content-Addressable IBP -- Rationale, Design and Performance," *IEEE International Conference on Information Technology: Coding and Computing (ITCC)*, Apr. 2004.
- F.N. Abu-Khzam, R.L. Collins, M.R. Fellows, M.A. Langston, W.H. Suters and C.T. Symons, ``Kernelization Algorithms for the Vertex Cover Problem: Theory and Experiments," *ACM-SIAM Workshop on Algorithm Engineering and Experiments (ALENEX)*, Jan. 2004.

Technical Reports

- R. L. Collins, ``IBPCA:IBP with MD5," *Technical Report CS-03-511, University of Tennessee Department of Computer Science*, Nov. 2003.