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EDUCATION **University of Notre Dame**, Notre Dame, Indiana
 Ph.D, Computer Science and Engineering, 2009 (*Advisor:* Dr. Peter Kogge)
 M.S., Computer Science and Engineering, 2005
 B.S. (*Cum Laude*), Computer Engineering, 2002

PROFESSIONAL **Emu Solutions**, South Bend, Indiana
 EXPERIENCE *Software Engineer* *2011-Present*

- Graphics processor programming for image/video filtering applications.

Department of Computer Science and Engineering

University of Notre Dame, Notre Dame, Indiana

Post-doctoral Research Associate *2009-2011*

- Designed message routing algorithms for a networking topology geared to high performance computing systems.
- Developed software to model and analyze the performance of various implementations of the above topology.
- Validation of probabilistic models to physics-based models for electrostatic (molecular scale) quantum-dot cellular automata (QCA) wires.

Graduate Research Assistant *2002-2009*

- Modeled and analyzed microprocessor organization when considering technology, memory organization, and workload.
- Developed an XML file format system for QCA design tools.
- Created several approaches to model and analyze QCA reliability; some approaches may save millions of hours of computation time.
- Implemented a physics-based simulator for electrostatic QCA wires.
- Supervised multiple undergraduate researchers on various QCA topics which led to one peer-reviewed publication, a technical report, and several software tools.

Delphi (Delco Electronics) Automotive Systems, Kokomo, Indiana

Integrated Circuit Design Intern *2001*

- Probe-based IC testing
- Transistor resizing for new fabrication process

Software Engineering Intern *2000*

- Developed a software library for use with CAN-bus devices

TEACHING EXPERIENCE	University of Notre Dame , Notre Dame, Indiana <i>Instructor: Computer Architecture II</i> 2006, 2007, 2010 <ul style="list-style-type: none">• Full responsibility for course. <i>Teaching Assistant: Computer Architecture I & II</i> 2003-2004 <ul style="list-style-type: none">• Responsible for lab instruction and grading of labs and homeworks.
COMPUTING SKILLS	Languages: C, Matlab, XML, shell scripting, MIPS assembly, CUDA OS: Mac OS X (primary), Linux (regularly), Windows (occasional) Other: LaTeX, MS Office, Condor (grid/distributed computing), Sun Grid Engine (batch computing)
HONORS AND AWARDS	Upsilon Pi Epsilon, Inducted 2004 (Inaugural induction) Eta Kappa Nu, Inducted 2002
PROFESSIONAL ORGANIZATIONS	ACM: Association for Computing Machinery (Since 2004) IEEE: Institute for Electrical and Electronics Engineers (Since 2003) <ul style="list-style-type: none">• IEEE-Computer Society
SERVICE	Reviewer for the following: <ul style="list-style-type: none">• ACM Journal on Emerging Technologies in Computing Systems• Integration, the VLSI Journal (Publisher: Elsevier)• IEEE Transactions on Computers• IEEE Transactions on CAD of Integrated Circuits and Systems• IEEE Transactions on Nanotechnology• IEEE Transactions on VLSI• Institution of Engineering and Technology (IET) Electronics Letters• Microelectronics Journal (Publisher: Elsevier) Habitat for Humanity Notre Dame Student Chapter <ul style="list-style-type: none">• Former construction coordinator and advisor (One home constructed per year for 15+ years).
UNDER- GRADUATE PROJECTS SUPERVISED	Department of Computer Science and Engineering University of Notre Dame , Notre Dame, Indiana <ul style="list-style-type: none">• Four students across six semesters from 2003-2008• One technical report and one refereed workshop paper• Multiple software tools created• Topics:<ul style="list-style-type: none">• Parallelization of a statistical mechanical QCA simulator• Geometric analysis of defective QCA wires• Logic reduction in QCA• Digital logic simulator for QCA

- PAPERS UNDER REVISION
1. **T.J. Dysart** and P.M. Kogge, "Fault-Free Fixed Fanout Generalized Fat Trees"
- ACCEPTED FOR PUBLICATION (2)
1. **T.J. Dysart** and P.M. Kogge, "Reliability Impact of N-Modular Redundancy in QCA," To appear in *IEEE Trans. on Nanotechnology*
 2. P.M. Kogge and **T.J. Dysart**, "Using the Top500 to Trace and Project Technology and Architecture Trends," To appear in 2011 International Conference for High Performance Computing, Networking, Storage and Analysis (Supercomputing – SC11).
- JOURNAL PUBLICATIONS (3)
1. **T.J. Dysart** and P.M. Kogge, "Organizing Wires for Reliability in Magnetic QCA," *ACM Journal on Emerging Technologies in Computing Systems*, Vol. 5, Num. 4, Article 19, Nov. 2009
 2. **T.J. Dysart** and P.M. Kogge, "Analyzing the Inherent Reliability of Moderately Sized Magnetic and Electrostatic QCA Circuits via Probabilistic Transfer Matrices," *IEEE Trans. on VLSI*, Vol. 17, Num. 4, pp. 507-516, April 2009
 3. K. Walus, **T.J. Dysart**, G.A. Jullien, A.R. Budiman, "QCADesigner: A Rapid Design and Simulation Tool for Quantum-Dot Cellular Automata," *IEEE Trans. on Nanotechnology*, Vol. 3, Num. 1, pp. 26-31, March 2004
- REFEREED CONFERENCE AND WORKSHOP PUBLICATIONS (11)
1. **T.J. Dysart** and P.M. Kogge, "System Reliabilities when Using Triple Modular Redundancy in Quantum-Dot Cellular Automata," In *Proceedings of the 23rd IEEE International Symposium on Defect and Fault Tolerance in VLSI Systems*, pp. 72-80, Oct. 2008
 2. **T.J. Dysart**, D.J. Lohmer, P.M. Kogge, "Using Geometric Analysis to Estimate the Yield of Molecular QCA Memory Structures," In *Proceedings of the 1st IEEE International Workshop on Design and Test of Nano Devices, Circuits and Systems*, pp. 45-48, Sept. 2008
 3. **T.J. Dysart** and P.M. Kogge, "Comparing the Reliability of PLA and Custom Logic Implementations of a QCA Adder," In *Proceedings of the 1st IEEE International Workshop on Design and Test of Nano Devices, Circuits and Systems*, pp. 53-56, Sept. 2008
 4. **T.J. Dysart** and P.M. Kogge, "Probabilistic Analysis of a Molecular Quantum Dot Cellular Automata Adder," In *Proceedings of the 22nd IEEE International Symposium on Defect and Fault Tolerance in VLSI Systems*, pp. 478-486, Sept. 2007
 5. **T.J. Dysart** and P.M. Kogge, "Probabilistic Analysis of a Quantum-Dot Cellular Automata Multiplier Implemented in Different Technologies," In *Proceedings of the 4th Non-Silicon Computing Workshop* held in conjunction with the 34th International Symposium on Computer Architecture and the Federated Computing Research Conference 2007, pp. 41-48, June 2007

6. **T.J. Dysart**, P.M. Kogge, C.S. Lent, and M. Liu, “An Analysis of Missing Cell Defects in Quantum-Dot Cellular Automata,” In *Proceedings of the 1st IEEE International Workshop on Design and Test of Defect-Tolerant Nanoscale Architectures (NanoArch)* held in conjunction with the VLSI Test Symposium, pp. 3.1-3.8, May 2005
7. S.E. Frost, **T.J. Dysart**, P.M. Kogge, and C.S. Lent, “Carbon Nanotubes for Quantum-Dot Cellular Automata Clocking,” In *Proceedings of the 4th IEEE Conference on Nanotechnology*, pp. 171-173, Aug. 2004
8. D.A. Antonelli, D.Z. Chen, **T.J. Dysart**, X.S. Hu, A.B. Kahng, P.M. Kogge, R.C. Murphy, and M.T. Niemier, “Quantum Dot Cellular Automata Circuit Partitioning: Problem Modeling and Solutions,” In *Proceedings of the 41st Design Automation Conference*, pp. 363-368, June 2004
9. **T.J. Dysart**, B.J. Moore, L. Schaelicke, P.M. Kogge, “Cache Implications of Aggressively Pipelined High Performance Microprocessors,” In *Proceedings of the 4th IEEE International Symposium on Performance Analysis of Systems and Software (ISPASS)*, pp. 123-132, Mar. 2004
10. **T.J. Dysart** and P.M. Kogge, “Strategy and Prototype Tool for Doing Fault Modeling in a Nanotechnology,” In *Proceedings of the 3rd IEEE Conference on Nanotechnology*, Vol. 2, pp. 356-359, Aug. 2003
11. K. Walus, **T.J. Dysart**, G.A. Jullien, A.R. Budiman, “QCADesigner: A Rapid Design and Simulation Tool for Quantum-Dot Cellular Automata,” In *Proceedings of the 2nd International Workshop on Quantum Dots for Quantum Computing and Classical Size Effect Circuits*, pp. 22-23, Aug. 2003, *Note: Refereed Abstract*

THESES,
TECHNICAL
REPORTS, &
WHITE PAPERS
(5)

1. **T.J. Dysart**, “Implementing a Generic Three State Coherence Vector Model for QCA,” White paper, 2009
2. **T.J. Dysart**, “It’s All About the Signal Routing: Understanding Reliability in QCA Circuits and Systems,” Ph.D. Dissertation, 2009
3. **T.J. Dysart**, D.J. Lohmer, P.M. Kogge, “Missing Cell Patterns Causing Circuit Failures In Densely Packed Molecular QCA Wires,” Technical Report 2008-08, Dept. of Computer Science and Engineering, University of Notre Dame
4. **T.J. Dysart**, “Defect Properties and Design Tools for Quantum Dot Cellular Automata,” Master’s Thesis, 2005
5. **T.J. Dysart** and P.M. Kogge, “XML Based File Format for QCADesigner,” Technical Report 2004-26, Dept. of Computer Science and Engineering, University of Notre Dame

INVITED TALKS *It's All About the Signal Routing: Understanding the Reliability of QCA Circuits and Systems*, 1st International Workshop on Quantum-Dot Cellular Automata, Vancouver, B.C., Aug. 2009

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