

# Andrew A Davidson

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## Education

Ph.D. Computer Engineering, University of California, Davis, *expected 2012.*

In my third year working under Professor John Owens.

B.S. Computer Engineering, Louisiana State University, 2008.

Minor: Mathematics.

## Fields of Interest

Data Parallel Algorithms, Auto-tuning Algorithms, Numerical Methods, Computational Geometry

## Research Experience

*Louisiana State University, Center for Computation and Technology*

Undergraduate Researcher, July 2005-July 2008

Worked on Cactus, an open source computation environment, for supercomputer clusters and developed thorns (code modules) to solve Maxwell's Equations.

Developed code to solve simple Computational Fluid Dynamics (CFD) problems on a GPU using shader languages (Cg).

*University of California Davis, Institute for Data Analysis and Visualization*

Undergraduate Research Intern, June 2007-August 2007

Worked with Professor John Owens in further developing the CUDA Data Parallel Primitives(CUDPP) Library, and implementing a Smith-Waterman algorithm on the GPU using the scan primitive.

*University of California Davis, Department of Engineering*

Graduate Researcher & PhD Student, September 2008-Present

Continue to work on a number of projects concerning parallel programming such as: maintenance and code development for the CUDPP Library, auto-tuned GPU algorithms, data-parallel primitives and structures, and GPU based kd-range trees.

### *Tokyo Institute of Technology, Global Scientific Collaboration Division*

Graduate Researcher, June 2009-August 2009

Worked with Professor Aoki on auto-tuning algorithms for GPU clusters.

### *Microsoft Research, Cambridge*

Graduate Researcher, June 2010-September 2010

Worked with Satnam Singh on Microsoft's Accelerator, a high-level language meant to target various architectures. I created a variety of applications using both Accelerator and CUDA and compared performance.

### *Software Projects*

Developer since June 2007:

CUDPP Library, An open-source library for data-parallel primitives on the GPU.

## Publications

*An Auto-tuned Method for Solving Large Tridiagonal Systems on the GPU.* Andrew Davidson, Yao Zhang, John D. Owens. Proceedings of the 25th IEEE International Parallel and Distributed Processing Symposium, May 16-20, 2011.

*Toward Techniques for Auto-Tuning GPU Algorithms.* Andrew Davidson, John D. Owens. Para 2010: State of the Art in Scientific and Parallel Computing, June 2010.

*Register Packing for Cyclic Reduction: A Case Study.* Andrew Davidson, John D. Owens. Proceedings of the Fourth Workshop on General Purpose Processing on Graphics Processing Units, March 2011

*A Hybrid Method for Solving Tridiagonal Systems on the GPU.* Yao Zhang, Jonathan Cohen, Andrew A. Davidson, John D. Owens. In GPU Computing Gems, 2010. In press.

*Using a Graphics Processor Unit (GPU) for Feature Extraction from Turbulent Flow Datasets.* National Conference for Undergraduate Research (NCUR), April, 2006.

## Honors, Awards, & Fellowships

Howard Hughes Medical Institute Scholar July 2004- December 2005

Louisiana Science, Technology, Engineering, and Mathematics (LA-STEM) Research Scholar December 2005 - February 2008

NSF Fellowship Honorable Mention April 2008

NSF/EAPSI Fellow June 2009

## Miscellaneous

*Computer Skills:* C, C++, L<sup>A</sup>T<sub>E</sub>X, CUDA, Linux, Matlab, Python.

*Languages:* English (native), Japanese (advanced), Icelandic(intermediate).