

Dana Schaa

CONTACT

INFORMATION

Department of Electrical and Computer Engineering
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RESEARCH

INTERESTS

GPU Computing, OpenCL, Data-parallel Architectures and Memory Systems, Systems Programming

EDUCATION

Northeastern University, Boston, MA

- Ph.D. Electrical and Computer Engineering
(expected completion date: Dec. 2012)
 - Advisor: Professor David R. Kaeli
- M.S. Electrical and Computer Engineering
 - Thesis Topic: Exploring the Multiple GPU Design Space
 - Advisor: Professor David R. Kaeli

California Polytechnic State University, San Luis Obispo, CA

- B.S., Computer Engineering, June 2006
 - *Magna cum Laude*, With Honors

ACADEMIC

EXPERIENCE

Northeastern University, Boston, MA USA

Ph.D. Research

June 2008 to Present

- Performance Portability for OpenCL
 - *In progress*
- Memory System Design for Heterogeneous Architectures
 - *In progress*
- Distributed OpenCL
 - Created an efficient, open-source implementation of OpenCL that runs on remote machines. No modifications required to programmer code.
- GPU Ultrasound
 - Working with *company* to develop OpenCL implementation of processing algorithms for advanced ultrasound. Ongoing project (approximately 2 years).

Masters Research

August 2006 to May 2008

- Parallel Programming and Performance Prediction on GPGPUs
 - Studied communication and computation aspects of computation and communication with regards to execution across multiple parallel GPUs. Created models which allow the accurate prediction of execution time as multiple GPU applications scale to larger numbers of GPUs or increase data set size.

- Automated Parallelization using Star-P
 - Conducted a study of programmer effort versus parallel performance while using Star-P. Compared performance to industry standard benchmarks, including optimized FORTRAN libraries.

Lectures

- **AMD OpenCL University Kit** (13 lectures designed for university graduate and undergraduate courses)
- NVIDIA's CUDA Programming Model and Architecture (guest lecture)
- Processes, Threads, and Concurrency (guest lecture)
- Parallel programming with MPI, OpenMP, and Pthreads (guest lecture)
- Introduction to UNIX/Linux (guest lecture)

Teaching Assistant

Fall 2006

- Teaching assistant for undergraduate computer architecture.

WORK
EXPERIENCE

Advanced Micro Devices (AMD)—Boxborough, MA Feb-Jun 2011

- Helped code and optimize clSURF, an open-source OpenCL-based feature detection algorithm for image processing.
- Identified areas for performance improvement in OpenCL implementation.
- Wrote report with suggestions for improvements or extensions to OpenCL specification.

VMWare—Palo Alto, CA Jun-Dec 2008

- Worked with RAS Kernel Team on core dump analysis. Designed automated collection, parsing, and analysis tool. Was assigned kernel bugs as needed.

International Business Machines (IBM)—San Jose, CA Jun-Sep 2004

- Scripted an automated test plan for SW development team. Parsed program output to determine success rate. Created test suite for automation assistance.

International Business Machines (IBM)—San Jose, CA Jun-Dec 2003

- Evaluated remote access SW, created a scope document and project report, chaired meetings with development teams. Created automated log parser for HDD analysis.

TECHNICAL
EXPERTISE

Programming and Scripting Languages, APIs:

- C/C++, OpenCL, CUDA-C, Pthreads, MPI, OpenMP, Python, MATLAB, JAVA, L^AT_EX

Processors:

- AMD Evergreen/Northern Islands/Southern Islands
- NVIDIA Fermi/GT200/G80 series
- x86 (VT-x and SMV extensions)

Operating Systems:

- *NIX, Windows ALL, Mac OS X

TEXTBOOKS

- *Heterogeneous Computing with OpenCL*. Benedict Gaster, David R. Kaeli, Lee Howes, Perhaad Mistry, Dana Schaa.

PUBLICATIONS

- *GPU Acceleration of Iterative Digital Breast Tomosynthesis*. Dana Schaa, Benjamin Brown, Byunghyun Jang, Perhaad Mistry, Rodrigo Dominguez, David Kaeli, Richard Moore, Daniel B. Kopans. GPU Gems 4.
- *Accelerating a Hyperspectral Inversion Model for Submerged Marine Ecosystems using High-Performance Computing on Graphical Processor Units*. James Goodman, David Kaeli, Dana Schaa, Ayse Yilmazer. Algorithms and Technologies for Multispectral, Hyperspectral, and Ultraspectral Imagery XVI. Edited by Sylvia S. Shen, Paul E. Lewis. Proceedings of the SPIE, Volume 7695, pp. 76950G-76950G-8 (2010).
- *Exploiting Memory Access Patterns to Improve Memory Performance in Data-Parallel Architectures*. Byunghyun Jang, Dana Schaa, Perhaad Mistry, David Kaeli. IEEE Transactions on Parallel and Distributed Systems, 19 May. 2010. IEEE computer Society Digital Library.
- *Data Structures and Transformations for Physically Based Simulation on a GPU*. Perhaad Mistry, Dana Schaa, Byunghyun Jang, David Kaeli, Albert Dvornik, Dwight Meglan. 9th International Meeting on High Performance Computing for Computational Science (VECPAR 10), Berkeley, CA USA, 2010.
- *Exploring the Multiple-GPU Design Space (Best Paper Award)*. Dana Schaa and David Kaeli. In Proceedings of the 2009 IEEE International Symposium on Parallel and Distributed Processing (IPDPS 09). IEEE Computer Society, Washington, DC, USA, 1-12.
- *Exploring Novel Parallelization Technologies for 3-D Imaging Applications*. Diego Rivera, Dana Schaa, Micha Moffie, David Kaeli. Computer Architecture and High Performance Computing, Symposium on, pp. 26-33, 19th International Symposium on Computer Architecture and High Performance Computing (SBAC-PAD 07), 2007.