

2012 Symposium on Application Accelerators in High Performance Computing

(SAAHPC 2012)

**Argonne, Illinois, USA
10 – 11 July 2012**



**IEEE Catalog Number: CFP1225P-PRT
ISBN: 978-1-4673-2882-1**

2012 Symposium on Application Accelerators in High Performance Computing

SAAHPC 2012

Table of Contents

Welcome Message	vii
Committee.....	viii
Reviewers.....	ix

Technical Papers

The Fat-Link Computation on Large GPU Clusters for Lattice QCD	1
<i>Guochun Shi, Ronald Babich, Michael A. Clark, Bálint Joó, Steven Gottlieb, and Volodymyr Kindratenko</i>	
A Multi-Node GPGPU Implementation of Non-Linear Anisotropic Diffusion Filter	11
<i>Vivek K. Pallipuram, Nimisha Raut, Xiaoyu Ren, Melissa C. Smith, and Sumedh Naik</i>	
A Trip to Tahiti: Approaching a 5 TFlop SGEMM Using 3 AMD GPUs	19
<i>Rick Weber and Gregory D. Peterson</i>	
ALU Architecture with Dynamic Precision Support	26
<i>Getao Liang, JunKyu Lee, and Gregory D. Peterson</i>	
FPGA-Based Reconfigurable Computing for Pricing Multi-asset Barrier Options	34
<i>Rahul Sridharan, Gregg Cooke, Kenneth Hill, Herman Lam, and Alan George</i>	
ScalaPipe: A Streaming Application Generator	44
<i>Joseph G. Wingermuehle, Roger D. Chamberlain, and Ron K. Cytron</i>	
Energy Analysis of Parallel Scientific Kernels on Multiple GPUs	54
<i>Sayan Ghosh, Sunita Chandrasekaran, and Barbara Chapman</i>	
Power Aware Computing on GPUs*	64
<i>Kiran Kasichayanula, Dan Terpstra, Piotr Luszczek, Stan Tomov, Shirley Moore, and Gregory D. Peterson</i>	
<i>*Won NVIDIA Best GPU Paper Award for SAAHPC 2012</i>	
On Improving the Performance of Multi-threaded CUDA Applications with Concurrent Kernel Execution by Kernel Reordering	74
<i>Florian Wende, Frank Cordes, and Thomas Steinke</i>	

A Model for Programming Data-Intensive Applications on FPGAs: A Genomics Case Study	84
<i>Elliott Brossard, Dustin Richmond, Joshua Green, Carl Ebeling, Larry Ruzzo, Corey Olson, and Scott Hauck</i>	
GPU Acceleration of Pyrosequencing Noise Removal	94
<i>Yang Gao and Jason D. Bakos</i>	
For Three Easy Payments: Scoring Peptides with Portable Performance Using Specmaster	102
<i>Rick Weber, Gregory D. Peterson, and Robert Hettich</i>	
FPGA-Accelerated Isotope Pattern Calculator for Use in Simulated Mass Spectrometry Peptide and Protein Chemistry	111
<i>Carlo Pascoe, David Box, Herman Lam, and Alan George</i>	
Parallelizing Principal Component Analysis for Robust Facial Recognition Using CUDA	121
<i>Todd Goodall, Scott Gibson, and Melissa C. Smith</i>	
The Role of Precision for Iterative Refinement	125
<i>JunKyu Lee and Gregory D. Peterson</i>	
Acceleration of a Meteorological Limited Area Model with Dataflow Engines	129
<i>Diego Oriato, Simon Tilbury, Marino Marrocu, and Gabriella Pusceddu</i>	
Lock-free Hash Table on Graphics Processors	133
<i>Maryam Moazeni and Majid Sarrafzadeh</i>	
Performance Analysis of GPU Accelerators with Realizable Utilization of Computational Density	137
<i>Justin W. Richardson, Alan D. George, and Herman Lam</i>	
Automatically Optimized GPU Acceleration of Element Subroutines in Finite Element Method	141
<i>Jiří Filipovič, Jan Fousek, Bedřich Lakomý, and Matúš Madzin</i>	
Performance of FORTRAN and C GPU Extensions for a Benchmark Suite of Fourier Pseudospectral Algorithms	145
<i>B. Cloutier, B.K. Muite, and P. Rigge</i>	
Performance of Parallel Sparse Matrix-Vector Multiplications in Linear Solves on Multiple GPUs	149
<i>Ben Jamroz and Paul Mullaney</i>	
Using GPGPU to Enhance Simulation of the Functionalized Cahn-Hilliard Equation	153
<i>Jaylan Jones, Zhengfu Xu, Andrew Christlieb, and Keith Promislow</i>	
Author Index	157