Ashutosh Pattnaik

CONTACT INFORMATION (Office)

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RESEARCH INTERESTS

GPU Architectures, CPU-GPU Heterogeneous Architectures, New Memory Technologies

EDUCATION

The Pennsylvania State University, University Park, PA, USA — **Fall 2013 - Present**
Ph.D. Candidate in Computer Science and Engineering,
Advisors: Dr. Chita Das & Dr. Mahmut Kandemir
Current GPA: 3.78/4.0

National Institute of Technology, Rourkela, India — **Fall 2009 - Spring 2013**
Bachelor of Technology (*Hons*.) in Electronics and Instrumentation Engineering
GPA: 9.24/10 (Junior/Senior GPA: 9.77/10)

WORK EXPERIENCE

AMD Research, Sunnyvale, CA — Co-Op Engineer, Manager: John Keaty — **Summer 2016**

AMD Research, Austin, TX — Co-Op Engineer, Manager: John Keaty — **Summer 2015**

Penn State, University Park, PA — Graduate Research Assistant — **Fall 2013 - Present**

CURRENT RESEARCH

Understanding research issues and opportunities involved in near-data computing in GPUs and optimizing the scheduling of data and compute to minimize data movement costs.

PUBLICATION

Vignesh Adhinarayanan, Indrani Paul, Joseph Greathouse, Wei N. Huang, **Ashutosh Pattnaik**, Wu-chun Feng, "*Measuring and Modeling On-Chip Interconnect Power on Real Hardware*", In Proceedings of IEEE International Symposium on Workload Characterization (IISWC), Providence, Rhode Island, 2016.

Ashutosh Pattnaik, Xulong Tang, Adwait Jog, Onur Kayiran, Asit Mishra, Mahmut Kandemir, Onur Mutlu, Chita Das, "*Scheduling Techniques for GPU Architectures with Processing-In-Memory Capabilities*", In Proceedings of the 25th Parallel Architecture and Compilation Techniques (**PACT**), Haifa, Israel, September 2016

Onur Kayiran, Adwait Jog, **Ashutosh Pattnaik**, Rachata Ausavarungnirun, Xulong Tang, Mahmut Kandemir, Gabriel Loh, Onur Mutlu, Chita Das, "*µC-States: Fine-grained GPU Datapath Power Management*", In Proceedings of the 25th Parallel Architecture and Compilation Techniques (**PACT**), Haifa, Israel, September 2016

Adwait Jog, Onur Kayiran, **Ashutosh Pattnaik**, Mahmut Kandemir, Onur Mutlu, Ravi Iyer, Chita Das, *Exploiting Core-Criticality for Enhanced Performance in GPUs*, In Proceedings of the 42nd ACM International Conference on Measurement and Modeling of Computer Systems **(SIGMETRICS)**, Antibes Juan-les-Pins, France, June 2016

Adwait Jog, Onur Kayiran, Tuba Kesten, **Ashutosh Pattnaik**, Evgeny Bolotin, Nilardish Chatterjee, Steve Keckler, Mahmut Kandemir, Chita Das, *Anatomy of GPU Memory System for Multi-Application Execution*, In Proceedings of the 1st International Symposium on Memory Systems **(MEMSYS)**, Washington, D.C., October 2015

Ashutosh Pattnaik, Sharad Agarwal, Subhasis Chand, *A New and Efficient Method for Removal of High Density Salt and Pepper Noise Through Cascade Decision based Filtering Algorithm*, In Proceedings of the 2nd International Conference on Communication, Computing & Security (**ICCCS**), India, 2012

TALKS AND PRESENTATIONS

Scheduling Techniques for GPU Architectures with Processing-In-Memory Capabilities
PACT 2016, Haifa, Israel, September 2016

µC-States: Fine-grained GPU Datapath Power Management
PACT 2016, Haifa, Israel, September 2016

Exploiting Core-Criticality for Enhanced Performance in GPUs
SIGMETRICS 2016, Antibes Juan-les-Pins, France, June 2016

A New and Efficient Method for Removal of High Density Salt and Pepper Noise Through Cascade Decision based Filtering Algorithm
- ICCCS 2012, India, October 2012

TEACHING EXPERIENCE

Teaching Assistant, CMPEN 431, Introduction to Computer Architecture **Spring 2014**
Teaching Assistant, CMPEN 270, Digital Design: Theory and Practice **Fall 2013**

SKILLS

C/C++, Perl/Bash Scripting, Gem5, GPGPU-Sim, FabScalar, MATLAB, CACTI, GDB

COURSES @ PENN STATE

Topics in Computer Architecture	Applied Statistics
Computer Networks	Numerical Computations
Operating System Design	Programming Language Concepts
Approximate Computing	Algorithm Design & Analysis
Compiler Construction	Programming of Many-Core Architectures

COURSE PROJECTS

Implementation of a Parallel File System (PFS)

- Implementation of Client-side PFS interface calls and file cache.
- Centralized Metadata Manager and multiple File Servers with file striping capability.
- Support for concurrent readers and writers (writers work on different file blocks).

Evaluating the Energy Cost of Data Movement in GPGPU Applications

- Created micro-benchmarks for evaluating the energy requirements of data movement among the different levels of memory hierarchy in NVIDIA K20m GPU.

Implementation and Scalability Study of HPCG on Many-Core Architectures

- Ported and optimized the HPCG v2.4 code for implementation on Intel Xeon Phi coprocessors.

AMPEG: Flexible Approximate MPEG decoding for handhelds

- Implemented tuneable parameters for approximation in MPEG decoding for power-constraint handheld devices.

UNDERGRADUATE RESEARCH

Undergraduate Thesis, NIT Rourkela, India **Fall 2012 – Spring 2013**
Robotic Arm Control Through Human Arm Movement using Accelerometers

Summer Research Intern, IIT Kharagpur, India **Summer 2012**
Floating-Point and Fixed-Point Implementation of Divide & Conquer SVD Algorithm for Symmetric Tridiagonal Matrices

Research Intern, DRDO, India **Winter 2011**
Radar Wave Propagation Modeling

PROFESSIONAL SERVICE AND MEMBERSHIPS

- Submission Chair, International Conference on Supercomputing (ICS), Turkey, June 2016
- Student Member of ACM, IEEE, ACM SIGARCH, ACM SIGMETRICS
- On-Behalf Reviewer (Conferences): ISCA, MICRO, HPCA, IPDPS, ICCAD, PPoPP

REFERENCES

References are available on request.