Ashutosh Pattnaik

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RESEARCH INTERESTS

GPU Architectures, Heterogeneous Architectures, Near-Data Computing, New Memory Technologies

EDUCATION

Pennsylvania State University, University Park, PA   *Fall 2013 - Present*
Ph.D. Candidate in Computer Science and Engineering,
Advisor: Dr. Chita Das
Current GPA: 3.79/4.0

National Institute of Technology, Rourkela, India   *Fall 2009 - Spring 2013*
Bachelor of Technology (Hons.) in Electronics and Instrumentation Engineering,
Overall GPA: 9.24/10.0 (Major GPA: 9.77/10.0)

WORK EXPERIENCE

Pennsylvania State University, Research Assistant   Fall 2013 - Present
High Performance Computing Lab (HPCL)
Understanding research issues and opportunities involved in near-data computing in GPUs and heterogenous architectures and optimizing the placement of data and compute to minimize data movement costs.

AMD Research, Co-Op Engineer   May 2016 - August 2016
Mentors: Nuwan Jayasena, Yasuko Eckert Manager: John Keaty   Sunnyvale, CA
Researched on efficient interconnect topologies and data placement techniques for a multiple 3D-Stacked processing-in-memory enabled heterogeneous architecture.

AMD Research, Co-Op Engineer   June 2015 - September 2015
Mentor: Joseph Greathouse Manager: John Keaty   Austin, TX
Developed methodology and micro-benchmarks to perform detailed characterization of the energy usage of different ISA instructions in AMD GPUs.

PUBLICATIONS

[**HPCA 2017**] Xulong Tang, <u>**Ashutosh Pattnaik**</u>, Huaipan Jiang, Onur Kayiran, Adwait Jog, Sreepathi Pai, Mohamed Ibrahim, Mahmut T. Kandemir and Chita R. Das, ”**Controlled Kernel Launch for Dynamic Parallelism in GPUs**” In the Proceedings of the 23rd International Symposium on High Performance Computer Architecture, Austin, Texas, February 2017. *Accepatance Rate ≈ 22%*

[**PACT 2016**] <u>**Ashutosh Pattnaik**</u>, Xulong Tang, Adwait Jog, Onur Kayiran, Asit Mishra, Mahmut Kandemir, Onur Mutlu and Chita Das, ”**Scheduling Techniques for GPU Architectures with Processing-In-Memory Capabilities**” In the Proceedings of the 25th Parallel Architecture and Compilation Techniques (PACT), Haifa, Israel, September 2016. *Accepatance Rate ≈ 22.3%*

[**PACT 2016**] Onur Kayiran, Adwait Jog, <u>**Ashutosh Pattnaik**</u>, Rachata Ausavarungnirun, Xulong Tang, Mahmut Kandemir, Gabriel Loh, Onur Mutlu and Chita Das, ”**μC-States: Fine-grained GPU Datapath Power Management**” In the Proceedings of the 25th Parallel Architecture and Compilation Techniques (PACT), Haifa, Israel, September 2016. *Accepatance Rate ≈ 22.3%*

[**IISWC 2016**] Vignesh Adhinarayanan, Indrani Paul, Joseph Greathouse, Wei N. Huang, <u>**Ashutosh Pattnaik**</u> and Wu-chun Feng, ”**Measuring and Modeling On-Chip Interconnect Power on Real Hardware**”, In the Proceedings of IEEE International Symposium on Workload Characterization (IISWC), Providence, Rhode Island, 2016. (Best Paper Award) . *Accepatance Rate ≈ 30.4%*

[**SIGMETRICS 2016**] Adwait Jog, Onur Kayiran, <u>**Ashutosh Pattnaik**</u>, Mahmut Kandemir, Onur Mutlu, Ravi Iyer and Chita Das, ”**Exploiting Core-Criticality for Enhanced Performance in GPUs**”, In the Proceedings of the 42nd ACM International Conference on Measurement and Modeling of Computer Systems (SIGMETRICS), Antibes Juan-les-Pins, France, June 2016. *Accepatance Rate ≈ 13.4%*

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

[ICCCS 2012] <u>Ashutosh Pattnaik</u>, 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 the Proceedings of the 2nd International Conference on Communication, Computing & Security (ICCCS), India, 2012.

TALKS

- 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, Penn State Spring 2014
CMPEN 431, Introduction to Computer Architecture

Teaching Assistant, Penn State Fall 2013
CMPEN 270, Digital Design: Theory and Practice

COURSES @ PENN STATE

Topics in Computer Architecture	Applied Statistics
Computer Networks	Architecture & System Software Mobile System
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 devices.

SERVICE AND MEMBERSHIPS

- Submission Chair, International Conference on Supercomputing (ICS), Turkey, June 2016

- Reviewer (Journal): Microprocessors and Microsystems: Embedded Hardware Design, Elsevier

- On-Behalf Reviewer (Conferences): ISCA, MICRO, HPCA, IPDPS, ICCAD, PPoPP, IGSC

- Student Member of ACM, SIGARCH, SIGMETRICS and IEEE

REFERENCES

References are available on request.